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BUFFALO

N.Y. U.S.A.

NUMBER 1

AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

OCTOBER, 1908

\$1.00 A YEAR 10c A COPY



NEW TOOL STEEL CENTER CALKS



THE H & ROWE CALK COMPANY

Announce for the season of 1908-1909 a brand new Rowe Calk with a welded center of tool steel.

These calks have been thoroughly tested in actual service and have shown that they will wear longer and sharper than any other calk on the market.

At last a perfect calk has been made.

Try them and be convinced.

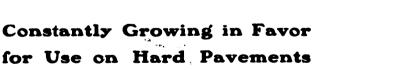
You will want these calks next winter.

Remember the name—TOOL STEEL CENTER ROWE CALK.

Free sample on request.



FAMOUS H CALKS





Made of famous Krupp steel.

Many of the fire departments throughout the country will use no other calks.

The cavalry of Europe are shod and made secure with wonderful H Calks.

They are the result of the world's experience in calks.

You cannot afford to be without them.

SOLD AT STANDARD PRICES.

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The One Suggests the Other

"SILVER" QUALITY has always been one of our strongest points,

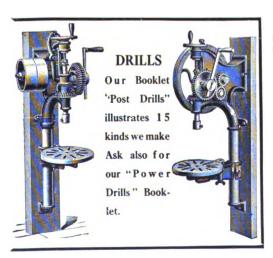
It costs us more money to use the very best of materials in "Silver" goods, but it pays, because every machine helps sell others.

If any machine you buy from us doesn't do just as our catalog claims for it, we want the machine back—not your money. We'd rather see the machine come back than have a dissatisfied customer.

The machines shown on this page, and our other tools, are made in several sizes. Send for our Machinery catalog or any of the following Booklets: "Band Saws and Jointers," "Post Drills," "Portable Forges," "Power Drills," and "Hub-Boring and Spoke Tenon Machines."

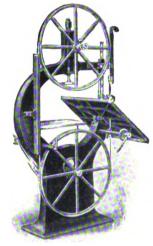
Silver Mfg. Company

365 Broadway : : SALEM, OHIO



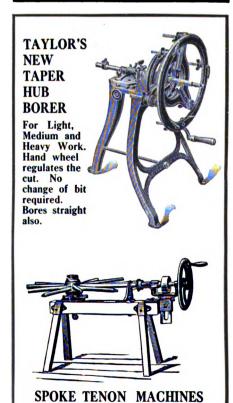






SILVER'S NEW BAND SAWS

Four Sizes—Patented tilting device for table—All parts easily reached by operator—New ratchet foot power device on 20 inch machine.



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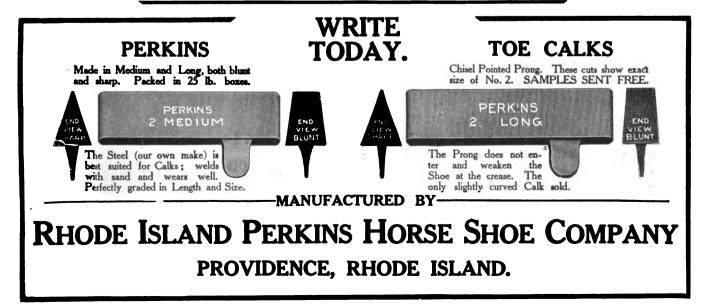
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Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern Hind City and Steel Countersunk. Free for the asking. We gladly send

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Machine Forgings and Shafts.
Crucible Tool Steel Forgings.
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Special Forgings of
Wrought Iron or Steel.

We can REPAIR old Wrought ANVILS no matter how badly they are broken.

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The Columbus Anvil & Forging Co., West Frankfort St., COLUMBUS, OHIO.

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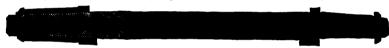
Our "Raven Gloss" Carriage Paint excels in hardness, durability, gloss, and brilliancy.

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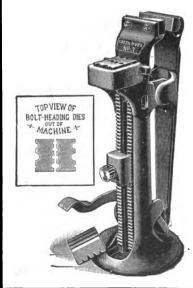
Guaranteed to be stronger and more rigid than solid steel axles. We make both. Write us

National Tubular Axio Co., EMIGSVILLE, PA.

Green River Shoeing Vise and Bolt Header.

Now is the time to be thinking of winter.

Every blacksmith should have a vise and bolt header in his shop.



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It is strong, handy and a labor saver.

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FOR ALL LIGHT VEHICLES. USED BY LEADING MANUFACTURERS.

Made in High-Grade Malleable Iron.

No. 440B. Buggy Size, 10 in., for 14 or 1 in. Straight Bed Axles. No. 440C. Buggy Size, 10 in., for 14 or 1 in. Fantall Bed Axles. 440E. Surrey Size, 12 in., for 1% or 1% in. Straight Bed Axles.

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Axle Tie and Rear Perch Irons will be furnished for PLAIN AXLES unless SWAGED AXLES are specified when ordering.

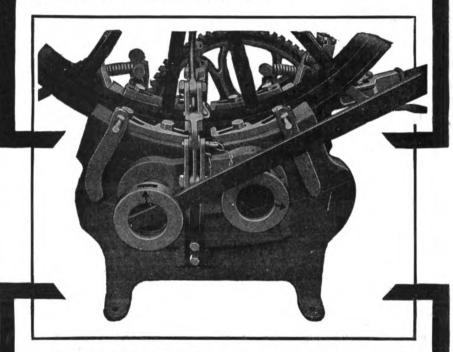
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is giving satisfaction to more blacksmiths than any other tire setter made. It is built by the longest established builders of edge grip cold tire setters in the world. It is our long practical experience that has made the BROOKS the best.

The Draw-heads move in a circle with the wheel, and upset the tire without kinking it. The Draw-heads of other machines move in a straight line, which often straightens or kinks the tire where it is upset. Our Grip key device is a necessity to keep the keys from slipping and bending the tire edgewise. Other machines are without it.



The BROOKS is throughly protected by patents; it is built right and tested for years in all parts of the country; declared the best by the U.S. Government officers, and in use by the U.S. Government.

Why waste time, patience and money, and dissatisfy your customers with an unsatisfactory machine, when you can get the best. Increase your profits, build up your trade and please you customers by using the BROOKS.

Send us your address and we will mail you our booklet, "Of Interest to Blacksmiths," and a Vest Pocket Memorandum book free. Write us now.

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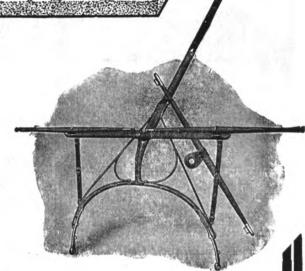


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The **PIONEER BRAND** has been brought to a standard of excellence in quality and style, the result of years of labor and study of the trade's wants, and is recognized as the peer, as is attested to by the most critical manufacturers, and is demanded by all buyers of vehicles throughout the country.



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The Pioneer Pole and Shaft Company, PIQUA, OHIO

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ECCLES BALL-BEARING COUPLINGS

The cut shows our coupling bolted to axle, and the form on flat leather bushing takes, when the shafts are placed and locked in the coupling. The leather can be securely fastened in by the user, by driving a soft wire nail through the small hole we drill, which clinches it.

When the shafts are removed, the bushing does not come out, but stays in the Coupling where it belongs. NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS.

We would like to send you our circular and have you try our Couplings. They will save you money.



Patented Nov. 25, 1902.

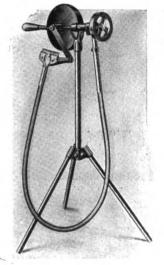
The Spring is pivoted at the front so that it can be turned forward out of the way of the wrench while clipping the Coupling to the axle.

These are two of the good points, but there are plenty more desirable features in our Couplings.

We also have a Catalog showing our full line of Carriage and Wagon Forgings all of which we make

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\$6.75 You Can Make Big Extra Money With Our Horse Clipper

OTHER BLACKSMITHS are making big profits clipping horses. Why not take up the work now? The investment you make for the machine is small and you take absolutely no chance for loss when you buy one of our guaranteed machines. The reason we can give such a strong guarantee is because we know "Davis Horse Clippers" are perfect in construction and material and the best bargain ever offered at the price for such a high-grade machine.

Our No. 3 machine is illustrated here. Our prices are low. For sale by leading blacksmith supply houses. If yours can't supply you promptly write us direct, enclosing price of machine you want, and we will make prompt shipment.

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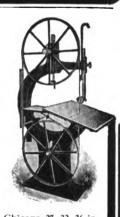
Chicago No. 57 Combination Saw a Jointer.

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Wood Working Machinery

ESIGNED especially for blacksmith and wagon shop equipment We show only a few of our machines here, selected from our big complete Write for circulars and net price list. Describes in detail all of our machines. Mention The American Blacksmith. WRITE TODAY. Come in and see us when in Chicago. Over 600 machines exhibited. Chicago 27, 32, 36 in. Band Saws.



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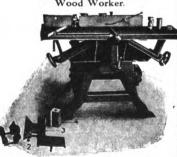
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Our Latest Improved Universal and Variety Wood Worker.







The BULL DOG has a grap on the shoe and won't let so.

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"BULL - DOG" TOE CALK

Every shoer will see at a glance where this new style BULL-DOG Calk differs from all others. The construction of the points overcome the disadvantage of the old styles.

A TRIAL WILL PROVE

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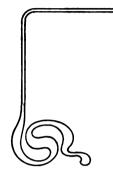
PHOENIX HORSE SHOE COMPANY

Rookery Building,

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WE GUARANTEE SATISFACTION OR REFUND YOUR MONEY

Little Giant.

TAPS



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is dependent upon quality. The quality of your work depends upon the quality of your tools.

"LITTLE GIANT"

Screw Cutting Tools and Machinery are beyond dispute on this point. You cannot do better than specifying this brand when placing orders.

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NATIONAL SAFETY SHORT-TURNING FIFTH WHEELS

have been on the market for over TEN YEARS

and used by good Carriage Builders everywhere. Ask your dealer for them. If he can't supply you, write for catalogue showing all our different styles.

National Safety Fifth Wheel Co., LANCASTER, PA.

Dissatisfied with Iron you are now using?

TRY BARS

FOR BOTH QUALITY AND SIZE.

Many Blacksmiths using them with very best results. Write for Prices.

THE MILTON MANFG. MILTON. PENNSYLVANIA.

in. wide, 14 in. high 14 10 10 er set of 4, 16 pounds. This shows the strength of our STANDARD as compared to the old style.

Bruce Malleable Wagon Standard

Tested thoroughly and guaranteed strictly as represented.

Note the great advantages of The Bruce Malleable Iron Bolater Standard over the old style.

2. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers,
a. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster.

3. The Malleable Iron Standard has a 3:1-2. In, face at base which prevents wear on wagon box, while the old style has only a 7.8 inch face.

4. Great time saver. Can be attached to boster in one-fourth the time required to put on wood stake. Adapted to new and repair work.

If you have never tried the Bruce Standard, Write today and ask for prices.

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Will turn off blue chips on any kind of work.

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A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during yourbusyseesonwould pay for itself in full.



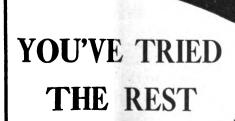
"CHICAGO WHEELS SAVE TIME

They're made of stuff that cuts

y Wheels, Glue, Emery, Pel-Wheels, Grieding Machi

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NOW BUY THE BEST

IT RINGS LIKE A BELL

The Celebrated Gillette Horse Grooming Machines

The Guarantee we give you with our Machine is as good as a U. S. Gold Bond.

We are so far in advance of other machines in improvements that we really have no competitors. Gillette Machines give satisfaction in every way.

Our claim is as broad as words can make it. The Gillette Clipping and Grooming Machine is better than any other Clipping and Grooming Machine in every particular.



The Gillette Machines were the first Horse Clipping and Grooming Machines made in any part of the world. Many imitations have been put on the market, but none have ever reached our high standard.

Send for our 1908 catalogue and read about our New Patent Chain and Grooming Brush.

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THE MONARCH DISC SHARPENER

brings the business to your shop. The wonderful work that the machine does can hardly be believed. Designed by a practical smith and made by the largest and oldest iron works in the West.



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that will fit the spindle of your drill press, holding GROOVED SHANK drills % to ½ in. inclusive, with reducer to 4.? Drills held by this chuck are much cheaper than drills with ½ in. or % in. shank. Simplest and cheapest chuck on the market.

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Price, postpaid, \$1.15. Catalog No. 17 AH of fine Tools free.

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The Scientific Hydraulic Tire Setter



works Easier and Quicker than any other
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You'll be sorry if you buy without seeing it

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The neatest, best looking, strongest, easiest and quickest to apply, and in every way the best standard ever offered for sale.

Made in but one size and will fit any size of bolster. It's never necessary to trim the bolster to get a fit. Can be applied in twenty minutes—simply bore three holes and bolt on. Will pay a better profit with less work.

Price, \$1.65 per set of four standards. Cash with order. Ask your supply house for them or write us.

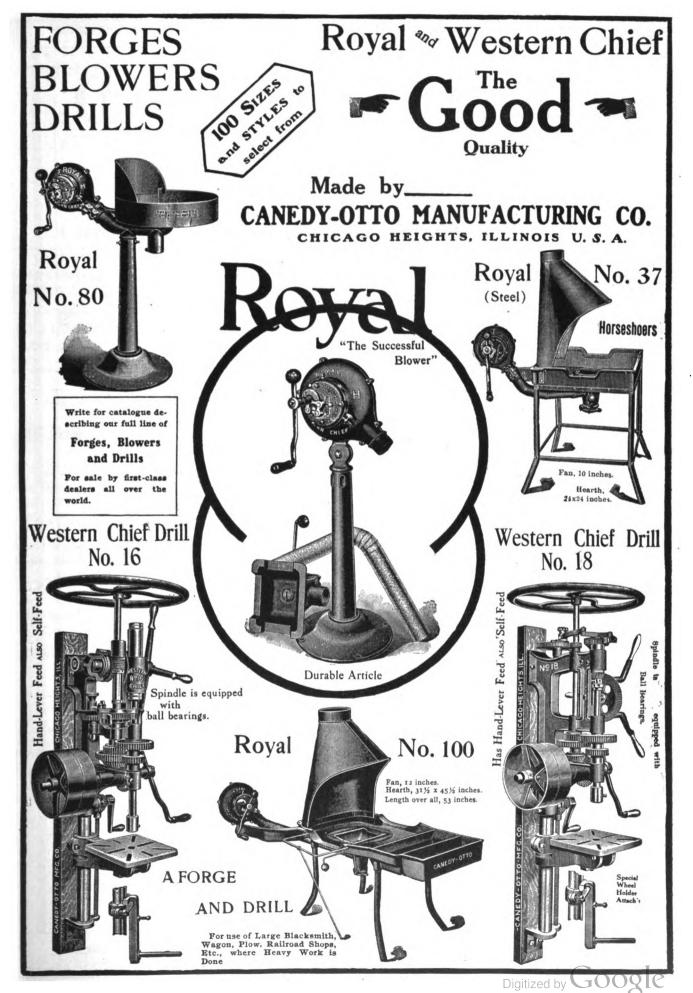
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We make about 200 different styles, sizes and lengths of calks to suit all tastes.



This style of Toe Calk is the Horse-shoer's favorite, especially during the Spring months. Made in seven sizes, and each size in three lengths (Medium, Long and Extra Long). We also make Country Pattern Heel Calks.



The steel for these calks is rolled especially for us and is made of tough Open Hearth stock (.35 carbon) to stand the hard usage Sharp Calks get.

Standard Toe Calks
Give Satisfaction

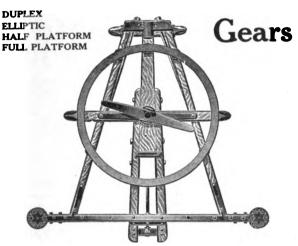
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Platform Gears

Low Freight Rates

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Prompt Shipments

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Send for Catalogue and Prices.



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"REECE" SCREW PLATES With Patent Adjustable Guides

No. 12 Reece Screw Plate with patent adjustable guide stock and 5 sizes taps and dies, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ ins., complete in case, **Special Net Price**, **\$7.87**. **Or**

No. 122 Reece Screw Plate, same as No. 12 set, with Hercules adjustable Tap Wrench included (see illustration of tap wrench above), **Special Net Price, \$8.72.**

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No Better Screw Plates Made than the CELEBRATED REECE KIND

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Little Giant PUNCH and SHEAR

The Most Powerful Hand Machine Made One operation of the lever does the work. No changing required

One man on the lever cuts 1-2 x 4 in.

Punches 5-8 in. hole in 1-2 in. iron.

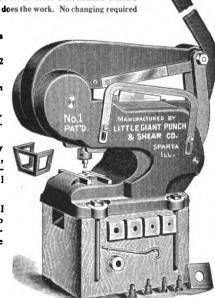
5 punches and dies with each machine.

Extra punches and dies, 50c each and guaranteed.

Hundreds in use by the U. S. Government, Contractors, M a n u facturers, Mechanical Schools, etc.

It is the BEST tool for the Blacksmith Shop for which it was especially designed. Made in three sizes.

Prompt Shipment Guaranteed



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Morse Twist Drill & Machine Co.

NEW BEDFORD, MASS,, U. S. A.

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Tools for Blacksmiths' Use.

Twist Drills, Reamers, Tops, Chucks, Cutters, Dies, Machinists' Tools, Machinery.

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the name that guarantees "quality," "accuracy" and "economy."

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The Best Horse Nail Manufactured and so specify for "The Capewell."

BY the most rigid inspection of the raw material—by both mechanical and chemical tests:

By the most thorough treatment under our own special process:

By careful, painstaking methods at every step in the manufacture of "Capewell" nails, we are able to produce the best horse nail ever made in the world.

Furthermore, we make it certain by the minutest inspection, that every box of nails shipped from our factory contains only perfect nails.

This is a great advantage and source of satisfaction to horseshoers.

"Capewell" Nails Are Best Suited To Your Requirements, if you are a user of horseshoe nails.

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30 miles per hour. Simple construction. Ample power.
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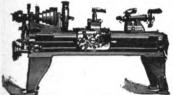
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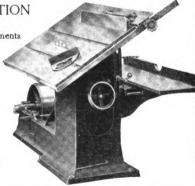
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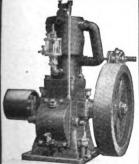
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Volume Eight.

While we ourselves as well as readers and advertisers have looked upon each succeeding issue of "Our Journal" as an improvement upon previous issues, we are not satisfied and hope we never will be. We are always, continually and everlastingly, striving toward a better, bigger, and broader paper to represent the grand old craft, and in our earnest striving for the ideal it is inevitable that we should make changes, alterations, and improvements.

A new department, "The Implement Repairman'' has been added to this volume and will insure more attention to and more articles on the subject of implement repairing. Mr. J. F. Sallows, as associate Editor, has already been introduced to "Our Folks." It is hardly necessary for us to point out the importance of having a man of Mr. Sallows' experience with us. His articles are not only interesting but practical and profitable and will continue to keep our readers in close touch with the newest and latest in the craft. Mr. Ethan Viall has just recently made his bow to our readers. His article in the September issue on brazing is, we believe. the best, most complete and most practical article that has been written upon that subject. Mr. Viall will continue his writings and observations upon such subjects as appeal to the general smith. Mr. W. G. Mumma's series upon gun and novelty repairing promises much of value and interest to general smiths. We consider ourselves fortunate in securing this series of articles and are sure they will prove popular with "Our Folks." The names of other contributors of high standing will appear as the seasons for their writings open. It was our intention to discontinue Thornton's Letters during this volume, but the interest shown by our readers in the preachments of this old smith has led us to arrange for a continuance of these interesting letters. Several new and surprising features are promised for the coming series of Thornton's Letters.

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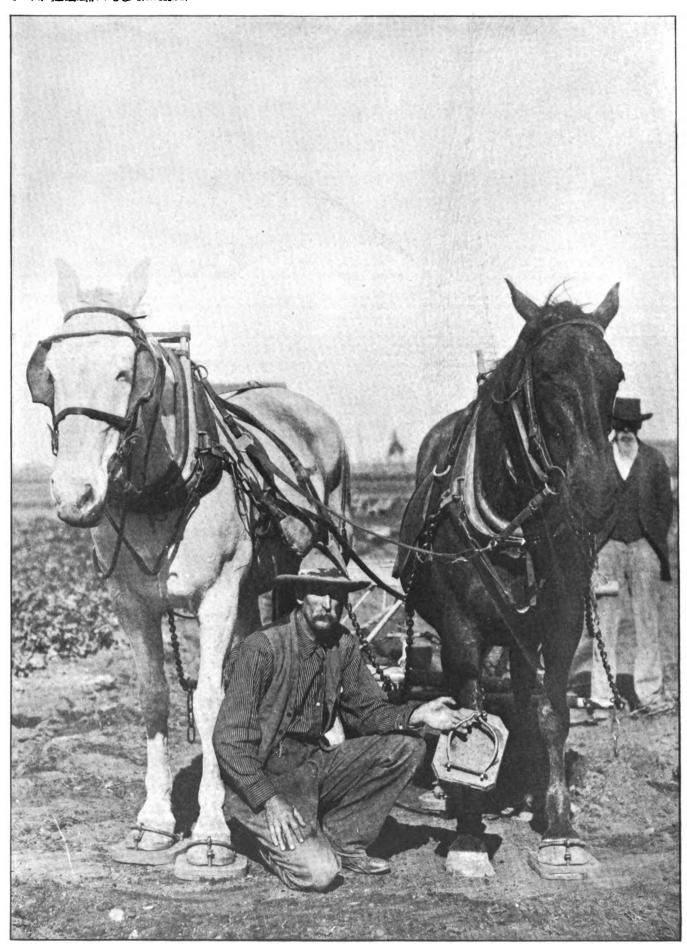
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SHOES WORN BY HORSES USED IN CULTIVATING THE PEATLANDS OF ORANGE COUNTY, CALIFORNIA

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The Hoof of the Horse

W. O. JULIUS



UPON the hoof of the horse depends the animal's worth, whether the animal be a racer, a coacher, or merely a delivery horse. It, therefore, behooves the horseshoer to know something regarding the hoof proper. And right here may be mentioned a simple, easy way in which the horseshoer can study the hoof, its structure, and its several divisions. Procure a foot of normal condition and form and soak it in water until the hoof can be separated into its respective parts, i. e., the wall, the frog, and the sole.

Upon examination we find the wall to be a hollow, horny shell which covers the foot on the front and sides. It is of varying thickness, and if we measure we find its thickest portion to be at the toe and that it gradually diminishes in thickness toward the sides. As it nears the heels it gradually thickens until the bars are reached. Here the wall turns toward the toe, gradually diminishing in thickness until it is lost in the interior foot structure.

The outer surface of the wall presents a glossy appearance in the normal state and appears to have a very close grain running up and down. The greatest height of the wall is at the toe. It gradually diminishes toward the heels.

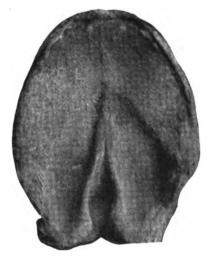
If we look upon the upper edge of the inside of the wall we find the groove which receives the coronary band. The coronary band follows the edge of the hoof wall from the center at the front, around both sides, back and to the heels.



A NORMAL HOOF

The surface of the inside of the wall presents a number of very thin, hornlike projections which run parallel to each other from the upper edge

of the wall downward and forward. The wall of the foot is itself composed of three layers. The first layer, called the periople, is the thin, shiny, varnish-like skin covering the entire exterior of the hoof wall. The office of this covering is to prevent rapid evaporation of the natural moisture of the horn. If this protective covering is removed by the rasp in a mistaken effort to smooth the surface of the wall, it is



GROUND-BEARING SURFACE OF A HOOF IN HEALTH

easily understood how the wall may be injured. The second, or middle, layer of the foot wall is the real wall. It is developed by the coronary band. The inner layer of the wall is the thin, horn-like substance previously mentioned.

The frog is that part of the hoof situated between the bars. It lies as a wedge, being broad at the heel of the hoof and tapering to a blunt point at the center of the hoof. The frog is soft and very elastic and acts very much like a cushion in arresting concussion, and as a rubber pad in enabling the horse to travel smooth roads safely. At the bars the frog is divided into two parts, or branches, by what is called the cleft of the frog. This cleft does not extend the whole length of the frog. As the point of the frog is reached its horn becomes

harder, until at its point in the center of the foot it is quite hard.

To the uninitiated the frog appears as a thick, solid mass of soft, rubbery horn. It is, however, simply a covering for the plantar cushion, which form it follows to a large extent. The plantar cushion, as explained in a previous article in these pages, is composed of elastic, fibrous tissues and lies between the horny frog and the perforans tendon.

We now come to the sole, the third division of the hoof. The sole is literally the floor of the hoof. It is of about the same thickness as the horny wall. Its under surface, or that presented to the ground when the horse is in motion, is slightly concave, uneven, and when left to itself for any length of time becomes covered with loose leaflets, or scales, of dead horn. The concavity of the sole makes it evident that the central portion of the normal hoof has no ground bearing. The inner surface of the sole is thickly covered by minute funnelshaped openings which contain the velvety tissue of the sole, by which the horny sole is secreted or produced. The structure of the sole is similar to the wall, i. e., fibrous. The fibers run in the same direction, downward and forward, as do those of the wall.

We have described and explained what may be termed the horny box of the horse's foot—that part of the animal's extremity which comes into direct

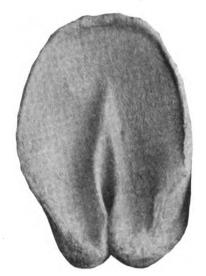
contact with the shoe. Because of this, it is by no means the only part of the foot with which the practical shoer should be thoroughly familiar. The interior structures of the foot and the entire limb to its juncture with the body



with the body a contracted hoof

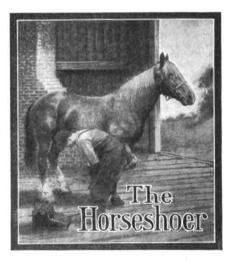
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should be studied and thoroughly understood by every shoer worthy of the name. The bones and ligaments, the



GROUND-BEARING SURFACE OF A CONTRACTED HOOF

arteries and veins, the protective and secretive organs, all should be carefully studied so that their relation to a diseased part may be understood; so that the cause and effect of certain conditions may be known; so that the shoer can avoid the following of such practices as will interfere with the healthy and normal functions of any, or all, of the leg tissues and organs.



Horses get cold feet in winter the same as a man does but as the horse hasn't any warm boots it's up to the shoer to leave him plenty of horn for protection from the cold. Be especially careful to not cut the horse's feet too close from now on. It seems as though cold irons would be bad enough, but these attached to a foot from which the sole has been unduly pared will certainly not add to the animal's comfort in winter.

A. W. P., Ohio.

When a new horse comes in, how many shoers take the trouble to make a thorough examination of the animal? Yet every shoer knows that to shoe a horse intelli-

gently, he should know how the horse stands, walks, and trots. The conformation, the weight, height, length, and proportion of the animal are important. The wear of the old shoe speaks volumes to the knowing shoer, and each limb, foot and hoof should receive minute inspection before careful shoeing.

CAREFUL, Ohio.

On Interfering and Deformed Horses.

G. F. WHITE.

In regard to brother C. H. Maloon's article on deformed horses I agree with him in some cases of deformity, but all horses are not deformed in the same way.

A deformed horse is a very common thing in a shop. There is hardly a day at any shop when a horse deformed in some part of the limb does not come in. I never could find any one rule that would apply to very many horses, as there are so many different ways of traveling and some turn one way and some turn another.

Now, my way is to pare the foot so the leg stands as near as possible to a perfect position before the shoe is put on. If it needs to be pared from the inside I pare it there, but, of course, nearly every horse's hoof grows more on the outside than on the inside. Then fit the shoe; not straight on the inside, but good and round so the horse will have a good bearing on all sides. Taking off one eighth of an inch from the edge of the hoof will not stop him from striking, and if the foot is properly pared the clinches can be left out and the horse will not touch. If it is a hoof that grows very fast on the outside. I put a small calk on the inside instead of turning up the heel, and the outside calk will wear down faster and leave the foot level as the hoof grows down.

I am in a shop having at least forty-five livery horses. They are the kind that get the worst kind of usage, and they are the hardest to keep from interfering, yet this is the only rule I can go by and come out right.

An Excellent Shoe for Punctured Feet.

WILLIAM LINDSEY.

Several mornings ago a young man brought a fine bay horse to my shop and requested me to examine one of the animal's feet. The horse was resting one of his toes on the ground. Upon examination I found the leg swollen to above the knee and the entire foot and lower leg feverish. At first I thought the swelling and fever was the result of a kick or bruise, but upon further examination I found the "hot spot" in the foot. I picked up

the foot and cleaned it out expecting to find a nail but instead the knife struck a bolt head. I took the pincers and pulled it out. The head of the bolt was three eighths of an inch square and the bolt itself had run into the foot for two and one half inches, entering

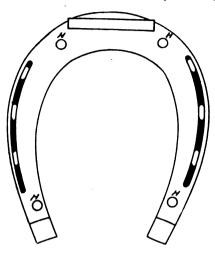


FIG. 1.—AN ORDINARY SHOE OF REGULAR SHAPE IS USED

at the side of the frog and running in at an angle toward the heel. I cleaned the foot, put some turpentine in the wound and then prepared the foot as I shall explain.

I have never seen a picture of a shoe just exactly like the one I used nor have I ever seen one used. I have used this shoe often and it will no doubt interest other shoers to learn about it. Take a common shoe, fit it with calks as required and fit to the foot. Now, drill four holes in the shoe as at H, H, H, H, in the engraving, viz., one on each side of the toe calk and one in front of each heel calk. Now tap holes with a 1-inch tap. Then take a thin plate of steel, an old scoop is very good, and

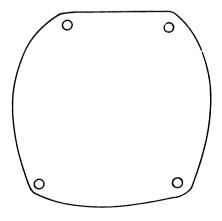


FIG. 2.—THE SOLE OR COVER PLATE IS SHAPED TO FIT THE SHOE

cut a solid sole as in the engraving, Fig. 2, fitting this sole to cover the ground surface of the shoe and drilling

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four holes in exact line with the 1-inch holes in the shoe.

After preparing a shoe and sole in this manner I nailed the shoe on, put medicine in the foot, packed the foot with cotton and attached the sole or plate with 1-inch set screws. With this shoe and plate the horse was able to walk anywhere, step on rocks, stones, and lumps of any kind without flinching. The plate is easily removed to repack the dressing and then just as easily replaced. I call this the Lindsey-Humane Shoe and charge from seventy-five cents to one dollar to make it and put it on.

The Corresponding Joints of the Horse and Man. J. M. BRASSEY.

It is interesting to pick out the corresponding joints in horse and man, and while one may be thoroughly familiar with the respective skeletons, it is easily possible to make a mistake in pointing out the corresponding joints. Especially when marking the lower limb is one liable to err.

In the engraving the joint at A corresponds to the shoulder joint in man. At B we have the elbow joint and at C the knee joint in the horse corresponding to the wrist joint in man. From the knee joint down the horse's leg corresponds to the hand and finger of man, the canon bone corresponding to the bone in the palm of man and running from the wrist joint to the knuckle joint. The three bones of man's finger correspond to the long pastern, the short pastern, and the pedal or foot bone in the horse.

The hip joint, marked D in the engraving, corresponds to the hip joint of man, while the knee of man corresponds to the stifle joint, at E, in the horse. The hock joint of the horse, at F, corresponds to the ankle joint in man, the prolongation at the hock of the horse corresponding to man's heel. The leg of the horse from the hock down corresponds to the foot and toe of man, similar to the lower front leg of the horse and the hand and finger of man. How the horse's bones and joints have seemingly become disarranged can only be conjectured. We can best dispose of the subject by laying it to a process of evolution which must certainly have changed the original animal very considerably and given us that most noble creature, the horse.

Causes of Changes in Horses' Feet.

A. F. LIBBY.

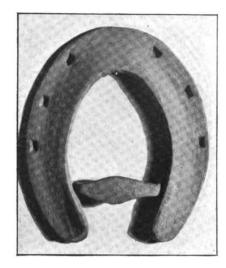
Horses, according to nature, live on grass and food which is easily digested.

This change from freedom to confinement, with the change of food, causes some of the diseases of the feet. Under this head comes acute founder and indigestion. I recently had a case with acute indigestion. The horse was very sick for nearly a week. There was no fever in the feet, but, still, the outer shell changed and a new hoof started on all feet, at the coronary cushion.

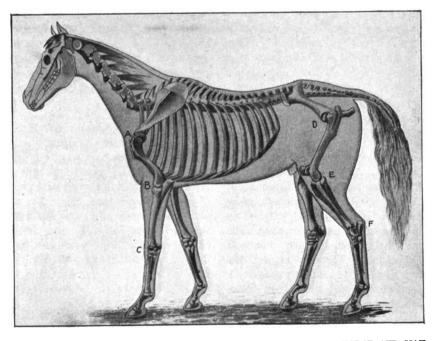
Second: Diseased feet are caused by the neglect of the horse and by not having the shoes reset at the proper time. This neglect causes subacute laminitis, ingrowing quarters, side bones in light horses, quarter cracks and corns.

Third: Feet may become diseased from natural malformation. I have seen colts splay-footed with splints and side bones which they inherited.

We have some few cases of foot



THE GROUND SURFACE OF THE SHOE SHOULD BE GIVEN CONSIDERABLE ROLL

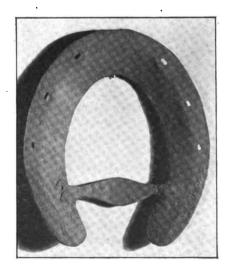


IT IS INTERESTING TO PICK OUT THE CORRESPONDING JOINTS IN HORSE AND MAN

troubles which can be traced directly to the horseshoer. It falls to the horseshoer to take these horses, let the condition of the feet be what it may, and restore them to as near a normal form as he can.

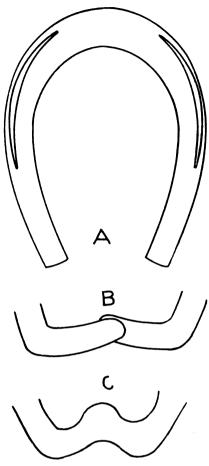
In acute diseases where it affects the feet through shifting inflammation, the shoes should be dished so that the strain will not come on the laminæ; give the shoe quite a roll, as shown in the engravings. Such cases will receive much benefit from internal treatment.

Horses that have foot troubles, which are caused from neglect, are often allowed to go two or three months without having their shoes reset, and in consequence they grow a very long foot. The outer shells of a horse's foot are fastened to the pedal bone by the



THE SHOE SHOULD BE DISHED SO THAT THE STRAIN WILL NOT COME ON THE LAMINAE

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A GOOD BAR SHOE EASILY MADE

laminae. The tendons and ligaments of the foot are, with one exception, independent of the shell, being fastened to the pasterns and the pedal bone. The lateral phalangean ligament connects with the foot. Through neglect the laminæ is strained, causing congestion of blood at that part which soon causes change of structure. The diseased conditions which may be benefited by shoeing I will mention in my next article.

The Bar Shoe, Its Use, and How to Make It.

J. H. BOWEN.

The bar shoe is, without doubt, the nearest approach to nature that we are able to get with a metallic shoe. And, as brother Harris said in his article on the bar shoe in these columns some time ago, why not use it always on feet that are inclined toward shrinkage at the heels and frog?

When no shoes are used on a horse's feet the weight of the animal comes largely on the frog and, naturally, this very important organ of the foot must keep in perfect health and condition. With a bar shoe made correctly we get practically the same effect by having the frog press and rest on the bar.

The bar shoe must, however, be

applied with caution, for the application of undue pressure is very liable to make the foot worse, especially in a case where the frog has been used to little or no pressure.

A simple method, as well as a quick method, of forging a bar shoe is to take a shoe, A, with rather long branches. Heat the branches in the fire and turn them over the horn of the anvil, as at B in the engraving, lapping one end over the other. Then reheat the ends, apply a little borax and weld the two ends, forging the bar out, as at C. This gives you a very good bar shoe in two heats and with very little trouble.

After forming the bar, calks and clips may be formed as usual. There is, of course, no need or call for the bar shoe to give frog pressure when the frog already receives plenty of natural pressure. In cases where it is desirable to relieve bearing at the heels the bar shoe will be found excellent. It should be borne in mind, however, that the pressure of the bar shoe must be applied gradually in cases where the frog has dried and hardened from lack of pressure and use.

The Principal Breeds of Horses and Their Origin.

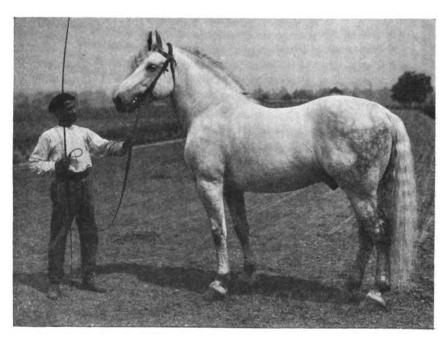
ARTHUR C. BARTON.

It is generally conceded that the horse of today is the result of a process of evolution and that, originally, what we of today know as a horse was a much smaller animal of somewhat different characteristics. The horse, as seen today, is supposed to have been a native of the plains of Central Asia, and from the time of the original discovery to the

present day probably no other animal has received so much attention in an effort to better and improve one or the other of the many breeds.

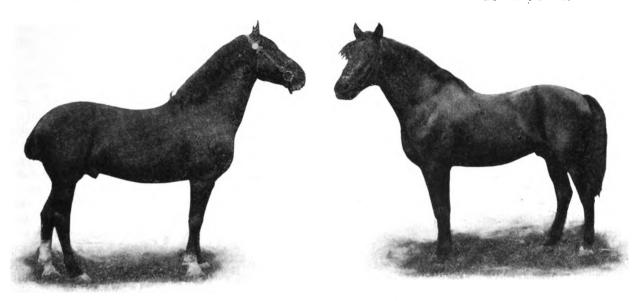
The thoroughbred horse being the oldest and best-established of all the breeds of horses, it is but natural that mention is made of this breed first. While it was many years before any clear or well-defined purpose appeared, the period of improvement began with the conquest of the British Isles by the Saxons. The foundation of the breed was built on a mingling of the native horses of England with those of central Europe, and later with those horses of lighter weight and speed qualities of Spain and North Africa. The blood of the native Arabian horse also permeates the thoroughbred stock of Great Britain. At the beginning of the eighteenth century breeding for speed and endurance was begun with definite plans. The first attempt at recording pedigrees, speed performances, and other matters, with the definite purpose of improving the breed of speed horses, was made in 1791. That year saw the real beginning of the Stud Book. In the middle of the eighteenth century the English racing calendar was begun and its publication has been continued in practically its original form to the present day. The American speed horse of today has much of English thoroughbred blood in his veins, in fact, it is doubtful if a great speed horse of American production can be found without some share of English speed blood in its veins.

The Hackney is a pure British production. The development of this breed



"THOR," AN EXCELLENT EXAMPLE OF THE MODERN PERCHERON STALLION

OCTOBER, 1908 THE AMERICAN BLACKSMITH



"ALEX 133" A HACKNEY THAT TOOK FIRST PRIZE AT CHICAGO

"MORGAN" STALLION AT HEAD OF UNIVERSITY OF ILLINOIS STUD

was the result of a demand for an animal of quick action and exceptional staying qualities for traveling over country roads before the coming of the macadamized roadway. The breed was developed by crossing the fore mentioned English thoroughbred with the decidedly heavier Shire, thus resulting in an animal of speed for traveling rough roads. The breed became very popular in the early days and was firmly established.

The Coach Horse is the next step toward the larger animal and dates back as far as the seventeenth century, when

the French government began to pay considerable attention to improving the breed of French horse stock. The Germans also paid considerable attention to improving the breeds suitable for coaching, and while the German coach horse is not so well known as the animal of French production, the former has many admirable qualities. Both breeds are, without doubt, founded, at least in part, upon the British thoroughbred with which the heavier native animals have been crossed.

The Suffolk-Punch, as the name implies, is a native of England, and is a breed particularly adapted to the needs of the farmer and agriculturist. In appearance the Suffolk is chunky, has a round, solidly built body with short legs. The breed originally descended from

Norman stallions and Suffolk cart mares is practically extinct, the modern Suffolk being the result of crosses with several breeds to better the original. The Suffolk, it is said, was the breed generally used in the pulling matches so popular in England during the seventeenth century.

In the extremely large and heavy breeds of horses we find the Shire, the Percheron, and the Clydesdale. All of these animals are especially noted for their excellent draft qualities. All are more or less permeated with the blood of the native animals of what was once known as Normandy and Flanders. As early as the eleventh century large stallions were imported from Flanders into England for the purpose of breeding

"SILVER HALL," A MAGNIFICENT EXAMPLE OF COACH HORSE

large draft stock. The Shire was the result of these importations.

The Percheron is a heavy breed of French origin. Of large, powerful build, its ability to travel comparatively fast with a heavy load makes it an especially admirable draft breed. 'Tis said that the Percheron was originally of Arabian extraction, but there is little doubt but that the black stock of Flanders contributed in no small degree to improve the size and strength of the breed.

The Clydesdale derives its name from a district on the Clyde in Scotland, where this breed was introduced by one of the dukes of Hamilton, who crossed the Lanark mares with imported Flemish stallions. This breed, like the Percheron, is noted for its rapid locomotion

> with a heavy load. It has much in common with the English Shire, in fact, the constant mingling of the latter with the Scotch Clydesdale has left very little difference between the two breeds. In form, disposition, color, and general characteristics the Shire and the Clydesdale may be classed as While bay browns, and one. blacks predominate in both breeds, grays and chestnuts are found. The legs of both horses are heavily haired, and long bunches of fine, silky hair from knee to fetlock is considered a mark of pure breeding.

Planning the Shop and Building the Forge.

C. W. METCALF.

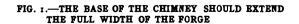
I wish to reply to Mr. E. H. Cayse, who says in the May issue that he wants lots of

information on the subject of shop arrangements. I don't know if my plan will do him any good or not. He doesn't state what kind of work he intends doing, nor does he state what

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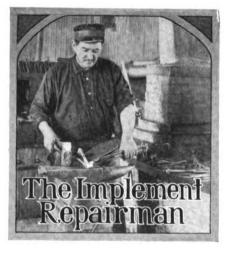
kind of machinery he intends to put in. But if he is going to run a general shop and horseshoeing combined I hope he will study my plan. The shop is thirty by forty feet with the forges in the middle of the shop. If you want a handy shop don't stick the forges up against the wall. His shop is twenty-two feet wide, but if he will add eight feet more to the width, and place the forges as shown in the illustration I think that he will never be sorry. Now as to a forge that won't smoke, I would say that any of them will smoke. The chimney is the important feature not the forge. If you can build stationary forges, I should recommend one of this style: Take boiler plate, say about twelve inches wide and long enough to make a circle from three to four inches in diameter and bolt legs on it to make it the height you want. Then bore a hole in one side for your blast pipe, bolt strips of iron across the bottom, place your tuyere iron and fill with brick and dry clay, tamping clay down well. There is a secret in building a successful forge. Nine out of ten will make mortar of the clay to build a forge. That is the wrong way—use your clay just as you dig it out, tamp it well and the heat won't crack it. In building

a round forge, make a round funnel hood and have not less than an eight-inch pipe. Have about three lengths of pipe fastened to the hood and the remaining pipe somewhat larger, so



you can raise and lower your hood. For my part, I would have no other. If you build a brick forge, notice in the engraving, Fig. 1, that the base of

the chimney extends the full width of the forge. It is only about a brick in width and lays in a circle out toward the fire pot. The face of the chimney should come within at least two inches of the center of your fire pot. If you use pipe above the roof, don't use six-inch stovepipe—your chimney won't draw. You have an eight-inch square hole in your chimney, use good judgment and put on pipe to match it. If you follow this method, I think that you will say "Thanks."



How to Make a New Ground Plow.

T. E. TINSLEY.

It may be of interest to some of my fellow craftsmen to know just how to make a new ground plow. I will give here my pattern and how I make them. First, have your timber three by six inches, cut your beam A four feet eight inches long, and the foot piece B three feet four inches long. Then shape them up as in the engraving. Now lay them down on your tressels and mark just where you want your tenon cut on the beam and the hole mortised in the foot

piece, giving it the same pitch as you see in the I use five engraving. eighths by two-inch steel for making the coulter C and one fourth by twoand-a-half-inch iron for the top and bottom beam plates. A hole is cut in each plate for the coulter to go through. Have the hole in the bottom plate just the size of the beam of your coulter. The hole in the top plate should

be just the width of the coulter beam but long enough to put in a key at the back. Bolt the two plates through the beam with one-half inch bolts having a brace rod with an eye on one end and a nut on the other to go from the back bolt through the foot piece as shown in the illustration.

I make lots of these plows and have never had a kick on a single one of them. I am a reader of THE AMERICAN BLACK-SMITH and enjoy it very much. I get a great deal of information out of it. I think it the best journal ever published on the blacksmithing, horseshoeing, and wood-working trades. I am a young smith and I enjoy reading every word that is printed in THE AMERICAN BLACK-SMITH paper, even to all the advertisements, for there is a lot to be learned yet. I do every job that comes to my shop and more still, for I go out in the country and work on machinery, boilers and engines, threshing machines and so on. And brothers, when you do a job of that kind, don't be afraid of charging too much, for you have got to charge for your time, your tools which you have bought or made, your coal, and your absence from the shop which is probably disappointing five or six customers. And another thing, if it hadn't been for you the man would have had to go to town, maybe ten or twelve miles, to get a machinist to fix his boiler or engine machinery, or whatever it might be. Therefore, do good work and charge a good price. Try to make a good, honest living and be friends with everybody. Meet everybody with a smile. Ask them to get down and come in. Tell

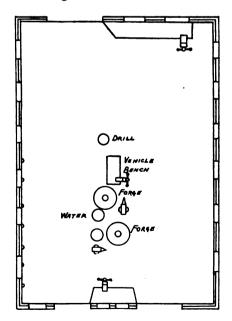


FIG. 2.—IF YOU WANT A HANDY SHOP DON'T STICK THE FORGE UP AGAINST THE WALL

them a funny story or two while you do their work. Don't be sullen and pouting around.

I am never idle in my shop. When



a dull day comes, as is sure to come to all shop owners, I am just as busy as can be making singletrees, doubletrees, lap-rings, hame hooks, log chain hooks and links, fitting up horse and mule shoes of all kinds, cleaning up and sweeping out my shop, or trading for a wagon or buggy that is out of repair and fixing it up and painting it to sell at a good profit. There is always something to do.

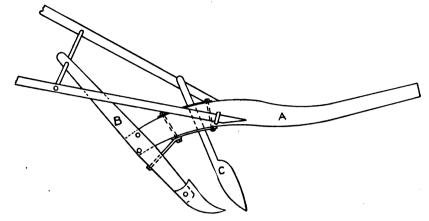
The Failures and Successes of an Apprentice.—5.

BY AN OLD TIMER.

The old story, that "a rolling stone gathers no moss" is familiar, but let us also remember that "a setting hen never gets fat." A man is sometimes handicapped by circumstances and conditions of things, even if he has ability. In such cases it may be better to change until he gets into the right place.

After leaving the last place mentioned I engaged with another smith; he planned to keep me from ten minutes to an hour over time, but if I was one minute late he would look up at the clock and then at me, as much as to say, "You are not earning your money." If I did not earn my money it was his fault for when there was not much work he would keep me digging away at some old thing that was of no account whatever and when a hurryup job did come I could not hurry because there was no reserve force to draw upon. I was simply dragged out all the time and not only myself but the smith too, for he worked that same way and when he ought to have been in the prime of life he had to retire, a physical wreck. I did not learn much here except how to abuse a man without swearing at him.

My next job was with a lumber firm for the winter. We pitched our camp in a valley by a brook with tall mountains on either side, covered to the forest line with spruce and hemlock extending farther than the eye could see. Our cabin was built of logs and our beds were made of hemlock boughs covered with blankets. They were comfortable to sleep on and I did not have a cold all winter. My appetite was excellent; I could eat with zest my rations of pork and beans three times a day. My work was splicing rope and mending chains, sleds, and tools. I got into trouble the first thing repairing a cant dog. It did not suit the boss, and after having some fun at my ignorance, he brought in a wooden pattern of a dog. I made one from the pattern and it would turn a log four inches through or hook on to the broad side of a barn. The test which river drivers give a peavey or There was a small foothill, not far away, and the way we scampered for this refuge was not slow. I assure you. We



A GROUND PLOW THAT GIVES GOOD SATISFACTION

cant hook is to lay a short piece of board flat on the ground, then stab into it, and if the hook will pick up the board it is all right. A river driver will throw a cant hook quite a distance and catch a log of any size, sometimes saving the life of a comrade by his skill. I shaped a wire pattern from this model of a cant dog given me and I have it now. Thinking that some brother would like it, I send a pattern with this letter.

Everything comes to an end, however, and so did this winter's work. It came suddenly, too. It was the last of March and the rain had been falling for two days. The water started the snow on the mountains and caused it to slide down into the valley, gathering on its way into a great mass of snow, water, ice, trees, and rocks, and forming a wall thirty or forty feet high.

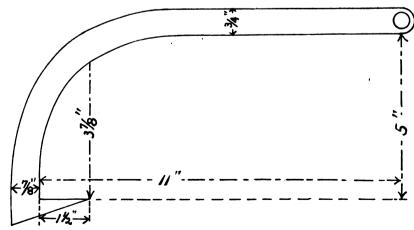
had hardly got there when one end of our camp and the logging sleds were dashed away. One of the sleds was found lodged in a tree a mile below the camp. One thing which was fortunate was the fact that above the log cabin, was a large boulder and a tree which caused the flood to divide, part following the brook and the other our logging path, thus saving one end of our cabin and also our teams. Well, boys, I have not told all of the tragedy at this place, but the fact is, if I get too far from the forge I am afraid the Editor will give me a "call down." In my next article I will start in business for myself.

(To be continued.)

How to Make a Set of Steel Well-Drilling Jars.

L. R. SWARTZ.

The accompanying engravings show a set of five-inch steel jars. The di-



PLAN AND DIMENSIONS OF A CANT DOG FROM "OLD TIMER'S" PATTERN

The ground shook like an earthquake. The noise was deafening. Still on came the huge mass like a great tidal wave. Its course was down the valley near our camp and our only safety was in flight.

mensions given are about right for the size tools used for drilling 51 to 61-inch holes with reliable machines of American make. There is such a great variety of sizes in the jars and tools used that

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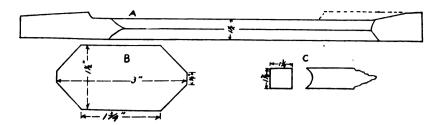


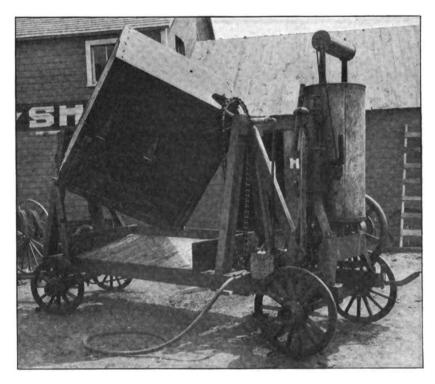
FIG. 1.—THIS FORM OF BAR GIVES GREATEST STRENGTH FOR ITS SIZE

it is hard to tell just what is wanted where a man wants to know how to make jars without stating the size and pattern desired.

For several years past it has been the practice among practical drillers in the United States to use short-stroke jars for drilling; the stroke of the jars being four to eight inches instead of twelve to twenty-four inches as formerly. The long-stroke jars are now used only for fishing or in connection with rod or pole tools. However desirable it might be in some respects, hard steel such as tool steel is not suitable for use in making jars, as it lacks the toughness to withstand the enormous strain and percussion to which jars are subjected in drilling where jars are really needed. In this country the best tool makers have for several years been making boxes and pins for joints of mild steel, because it makes a stronger and more durable joint. Some makers build steel-lined jars which give good service. The body of the jars being iron or mild steel lined with harder steel in the rims and heads where they are most subject to wear.

For making the links of the jars described here, twelve feet of 1½-inch by three-inch steel is required (four pieces each thirty-six inches long). This steel should be of close texture and tough, of a grade that will stand welding without materially changing its strength and texture. These thirty-six-inch bars

should be upset at the ends and forged to the shape shown at A, Fig. 1, B showing a cross section of the rim. This form gives the greatest amount ten inches long. Fig. 1 at C, gives the cross section and shape of this piece of hard steel, which should be four to six inches long. This piece of steel is welded between two of the thirty-six-inch bars, as shown in Fig. 2, A. The other end of the bars are then turned out so as to admit one link, the links being put one into the other, as shown in Fig. 2, B. If it is not desired to insert hard steel into the heads the bars may be forged as indicated by the dotted line in Fig. 1, A. After the links are assembled the ends are



A CEMENT MIXER MADE BY MR. MERTON J. ALLEN OF NEBRASKA. SMITHS LOOKING FOR SIDELINES WILL DO WELL NOT TO OVERLOOK THE CEMENT AND CONCRETE FIELD

of material which can be gotten into a hole of given size. If desired, a piece of harder steel may be welded into the head. The head should be about brought together, welded and scarfed as indicated by the dotted line in a portion of Fig. 2, A. Fig. 2, B shows the links assembled and an edge view of scarf for welding to the box or pin.

Welding cannot be too well done when making jars. If desired, the tool steel in the heads may be tempered before assembling the links. These jars will have an eleven or twelve-inch stroke and are suitable for either drilling or fishing. The dimensions of these jars may be changed to suit the purpose intended, but the proportions should be adhered to.

To Get and Keep Worth-Having Customers.

If you could present your business card to a man just when he is in need of your services you would stand a very good chance of getting that particular Digitized by

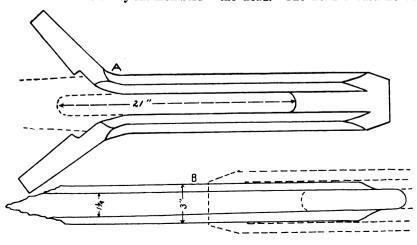


FIG. 2.—THE STRIKING SURFACE OF THE HEADS SHOULD BE ROUNDED TO PREVENT FRATHERING

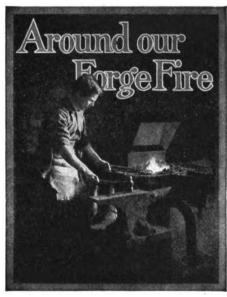
job; wouldn't you? If you could get your card before your man every day in the year—and keep it there—where the demand for your goods, work and services originates, you would most likely get all his trade. A worth-keeping calendar bearing your business card will remind those you want as customers that you can do the work they want done when they want it. THE AMERICAN BLACKSMITH calendar is a worth-keeping calendar. Some people keep a calendar because it is beautiful—others because it is useful. THE AMERICAN BLACKSMITH calendar for 1909 is both useful and beautiful. See announcement of an advertising opportunity for your shop on page 9 in this issue.

The Indiana State Reformatory. J. L. KNIGHT.

I have been asked about the shop and how inmates are treated at the Indiana State Reformatory. It is one of the best-managed institutions in the state. The discipline is of the best and the care of the inmates is of the best. The boys, by actual practice, are taught forging. welding, upsetting, jump welding, turning horseshoes, making hook and eye bolts, rings, band clutches, and, in fact, they do more than is done in some custom shops. Our shop is of the best of brick and concrete, with Buffalo downdraft forges, six fires, and all the necessary tools. At times, when not busy at any institution work, the boys would practice on forging different articles as above stated. This keeps them employed and at the same time they get the actual use of the tools. If one makes a mistake in this work, we never by any means discourage him, but tell him to try it over, every time trying to do it better and he would succeed. Of course. vou must keep them busy at something, which is better all around. A great many times you will have to answer unnecessary questions, but if you put it right with a good will and some encouragement your boy will go to work lighthearted, and the results will be better. They are well clothed and fed.

The general superintendent and his assistant are Christian gentlemen of high moral character. They also require their officers and instructors to be of the same material, for no man who cannot control himself can control This institution is actually turning out a goodly percentage of developed men in the trades. They have regular religious service every Sabbath, and issue the best of books from the library. These are great aids to a young

fellow who has met with misfortune. If an inmate will take advantage of what he can learn at this institution, he will come out with a trade, some education and morality, so that he can go into society and make a good citizen of himself. Of course, there are some exceptions to the rule, but not many. At one time it was thought that a trade school would not be successful in an institution of this kind, but if your boy or mine has to be confined it is better, by far, for him to be actually employed and under good management and discipline than for him just to exist in ignorance and idleness. None of that goes here, for the inmate is given a fair chance to become a very good citizen.



The Editor was busily looking over manuscript when Billy Jones, the horseshoer, walked in. Every one, from the tiniest tot attracted by the glare of the forge fire to the arrogant aristocrat with a fancy high stepper arrogant aristocrat with a rancy high stepper calls him Billy. Now, Billy is a real good sort of a chap—good hearted, kind, and generally very well liked. But, together with these qualities, Billy is also easy going, and this very often leads to carelessness in business. That's how the easy-going spirit affected Billy. Billy Jones has a fairly good smithing trade, but he is not given very much to figures, and this, no doubt, accounts for Billy's inability to show a big balance on the profit side of his ledger at the end of a big season.
"Hello! Billy," greeted the Editor,"What

brings you way up in this section of town? "I was just over to Brown's livery to close a deal for the coming year," returned Billy, "and I thought I'd drop in here."
"What kind of a contract did you make with them?" asked the Editor, handing his

visitor the cigars.

"Well, Brown's a good man to work for and I made a deal to shoe forty horses a

month for forty-two dollars-"What's that!" exclaime "What's that!" exclaimed the Editor, rather excitedly, "you don't mean to say

that you're going to shoe forty horses for forty-two dollars?"

"Why, yes, of course," said Jones calmly.
"Think it was flies I was going to shoe? What are you gettin' all excited about?"

"Excited!" returned the Editor, "why, it's enough to give a man a brain storm. How much can you make on that job?"
"Why, I don't really know, to tell you

the truth. I had to bid against four other shops, and it was simply a case of quoting a low price or losing the job."

"What good is any job if you lose money a it?" questioned the Editor. "If you're on it?" questioned the Editor. in business for the fun of the thing why there's nothing more to be said," continued

the Editor, with an air of finality.
"Why, I make something at that price," put in Jones hastily. "I'm not in business for fun nor my health."

"I wish you would show me where you make even a fraction of a cent," said the Editor, giving Jones a pencil and a writing

"Well now, shoes cost about four and a half cents a pound," began Jones, using his pencil. "That makes the average set cost about thirty-five cents. Then suppose you figure five cents for nails and three cents for coal; that brings your total to forty-three cents for the average set of shoes. I get a fraction more than a dollar a set, and I guess the difference between the cost, forty-three cents, and the dollar will cover my labor and incidental ex-penses." And Jones settled back in his chair with an air of triumph.

"Very good, as far as you've gone," began the Editor, taking up pencil and paper, "but let us see if your balance of fifty-seven cents really pays you for your time, labor and expenses. Suppose we figure on an and expenses. Suppose we figure on an average of eight horses per day for one fire. That's a high average, but it will bring the cost per horse down lower than a six or seven-horse average, which would be more The cost of a set of shoes remains correct. about thirty-five cents. Then we take the same five cents for nails and three cents for coal. Then steel calks cost something, and three cents must be added for these. there is shop rent, we'll say ten cents for that, for tools two cents, for interest on the investment one cent, for telephone, lighting and the like five cents. Now, we come to labor; you certainly consider your time worth at least three dollars a day. You need a floorman, and together you tack on at least sixty-five cents. Now, we have a total of one dollar and twenty-nine cents for the average cost per shoe, at the rate of eight horses per day for every day in the year." And the Editor handed his figures

"Your figures are all right, but one man can shoe a horse. It isn't necessary to bring up the cost by figuring on two men,"

said Jones. "It isn't a question, Billy, of putting up the cost. It's simply a question of figuring correctly," and the Editor emphasized a few more plain facts. "Remember, we figured on an average of eight horses per day for one fire. To take care of those eight horses you must have one fireman and one floorman. In the busy season you will average more than eight horses per d but in the slack season your average will be very much lower. If you've kept account of each day's business just see if you will average as many as eight horses per fire for a year. I don't think you will, and if you average six or seven your cost per horse will be considerably more.'

"I guess you've figured it right, Mr. Editor, and I'm much obliged to you. I don't think you'll catch me doing work at a loss any more. When I've got more time I'm coming in to get a few pointers on figuring costs and selling prices." And after a hearty handshake Billy Jones bid the Editor good day. The latter sat for some time as if much puzzled over the ways of some business men.

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The Blacksmith of Limerick.

Robert Dwyer Joyce, the author of this poem, was born in Glenosheen, County Limerick, in 1830, and died in Dub'in in 1883. He practiced as a physician with puch success in Boston, Massachusetts.

He grasped his ponderous hammer; he could not stand it mor

To hear the bombshells bursting and the thunder-

ing battle's roar.
He said: "The breach they're mounting, the Dutch-

man's murderous cre I'll try my hammer on their heads and see what that can do!

Now swarthy Ned and Moran, make up that iron

'Tis Sarsfield's horse that wants the shoes, so mind

not shot or shell."

e," cried both, "the horse can wait—for Sarsfield's on the wall, "Ah sure."

And where you go we'll follow, with you to stand or fall!"

The blacksmith raised his hammer, and rushed into the street

His 'prentice boys behind him, the ruthless foe to meet-

High on the breach of Limerick, with dauntless hearts they stood Where the bombshells burst and shot fell thick

and redly ran the blood.

"Now look you, brown-haired Moran, and mark

you, swarthy Ned; This day we'll prove the thickness of many a Dutchman's head;

Hurrah! upon their bloody path they're mounting gallantly;
And now the first that tops the breach, leave him

to this and me: The first that gained the rampart, he was a cap-

tain brave! A captain of the Grenadiers, with blood-stained dirk and glaive;

He pointed and he parried, but it was all in vain. For fast through skull and helmet the hammer found his brain!

The next that topp'd the rampart, he was a colonel bold.

Bright thro' the murk of battle his helmet flashed like gold.

"Gold is no match for iron!" the doughty blacksmith said.

As with that ponderous hammer he cracked his foeman's head!

"Hurrah for gallant Limerick!" black Ned and Moran cried,

As on the Dutchmen's leaden heads their hammers well they plied;

A bombshell burst between them-one fell without a groan,

One leaped into the lurid air, and down the breach was thrown!

"Brave smith! brave smith!" cried Sarsfield, beware the treacherous mine

Brave smith! brave smith! fall backward or surely

death is thine!" The smith sprang up the rampart and leaped the blood-stained wall.

As high into the shuddering air went foeman, breach and all!

Up like a red volcano they thundered wild and high,

Spear, gun, and shattered standard, and foeman thro' the sky;

And dark and bloody was the shower that 'round the blacksmith fell—

He thought upon his 'prentice boys, they were avenged, and well!

On foeman and defenders a silence gathered down, 'Twas broken by a triumph shout that shook the

ancient town;

As out its heroes sallied, and bravely charged and

slew,
And taught King William and his men what
Irish hearts can do!

Down rushed the worthy blacksmith unto the river side, He hammered on the foes' pontoon, to sink it

in the tide; The timber it was tough and strong, it took no

crack or strain—
ne, 'twon't break,'' the blacksmith roared, "Mavrone, 'twon't break, we "I'll try their heads again."

The blacksmith sought his smithy, and blew nis

bellows strong; He shod the steed of Sarsfield, but o'er it sang no song:
"Ochon! my boys are dead," he cried, "their loss

I'll long deplore,

But comfort's in my heart—their graves are red with foreign gore."



What's your idea of the wheel problem

He is a failure indeed, who admits it to himself.

The smith's hammer is a good thing to stick to.

Styles in hoof dressing will not change this fall.

Don't dishonor your craft by spelling it with a G.—graft.

Do you owe the shop or is it in debt to you? Of course you know.

A look before you leap will save you a look to see why you leaped.

Don't rasp under the clinches, but carefully file your trade catalogues.

A Suggestion—why not make concrete stock tubs and watering troughs as a side line? Compare these pages with those of a year

ago. We invite suggestions and criticisms. Good words backed by good works are

a good business getting team for the smith. Put your mark on what you make but

be sure that what you make is worth marking.

There's lots more to tool making than simply heating the metal and hammering it.

The only vice a blacksmith is supposed to know anything about is spelled with an s-vise.

Just so long as you do something, say something, be something, just so long will you be criticised.

Inattention to collections has caused the failure of many a business. Keep at the heels of your debtors.

Lots of men, like the belt on a loose pulley, do a great amount of hustling around, but accomplish nothing.

At your finger tips should your business be. A good system will tell you where you stand in a business way.

The smithing business is no place for the 'jolly, good fellow," though good, solid felloes are trade bringers.

"'Tis never too late to mend," returned Tom when asked when he was going to repair his leaky shop roof.

How do you do?—surely everything in "Our Journal" doesn't agree with your methods. Tell us how you do it.

The demand for young blood is constantly growing. Encourage the youngsters to take up the good, old trade and stick.

Lack of care will wear out the tools and equipment quicker than actual use. It pays to look after the equipment properly.

Now is the time to drive your business hard. It'll surprise you what a heap of hurrying business will stand before it will balk.

"The farmer is the coming man." The principal customer of the general smith is the farmer.T he smith is coming with the

Some men lose their own business attending to the other fellow's. The successful man makes a business of minding his own huginess

"I'd hate to employ a man who was continually postponing important jobs for fear that he would make a mistake" says Thornton.

A box of sand in the engine room may prevent a serious fire. It's excellent for extinguishing burning gasoline—better place a box of it near the gas engine.

"Why do you order tea-plates?" questioned Mrs. Newly-wed, "when we have a whole tea set." But her husband calmly told the jobbers' salesman to include Tplates in the order.

This new volume—are you going to allow it to slip by without one item from your pen? We want an interesting item from you—the sooner the better. Surely you can contribute something.

Feeding the profits of one department or branch of your business to keep another fat is poor business. Keep careful account of every branch of your business and know where you stand.

It's not coddling the boy wants, but a good, honest, square deal. Treat him as you would your own son. Teach him the trade and the things you have learned. It means a square deal for the future craft.

The bootblack usually announces his wares when he sees there is need of his services. Ever think to apply the same line of reasoning to your business? Keep your finger on the pulse of your customers' wants.

Throughout the campaign, before election and after the people have voted business must go on. No matter which side you are on, don't let the noise interfere with your work. Keep at it regularly, confidently, cheerfully, and persistently.

You can't hurt your neighbor's business by price cutting. A cut price is a boomerang that injures the thrower more than the one aimed at. If you desire more business than your competitor, advertise and push honestly for more trade. Keep hammering at prospectives in a way that means business.

Sharpen your pencil and figure it out yourself. Just take a small advance of five cents per shoe, how much more would you have in pocket if you had made a raise the first of last month? And without a cent of added cost! An organization will enable you to get what you deserve for your work. Ask the secretary today for his easy plans. A postal will do.

Six unsuccessful attempts to swim the English Channel have been made by T. W. Burgess, an English smith. In his most recent attempt he remained in the water for over twenty hours. Despite the rough sea and strong currents he was still strong when he gave up and climbed aboard the accompanying tug unassisted. It would have been necessary for him to remain in the water another six or seven hours to await the turn of the tide. He was within a mile of the French shore.

Profit is your excuse for being in business. Are you sure of your excuse? Carefully figured costs insure reliable knowledge on profits and losses. Buying price plus twenty-five cents to get a selling price isn't business. Time, rent or taxes, coal, light, fuel, insurance, repairs, tools and machines—all expense must be covered in cost of production. Each and every job must carry its proportion of the running expenses. A shop run without regard for running expenses cannot be run profitably.

American Association of Blacksmiths and Horseshoers.

You'll find a report of the recent meeting of the Kansas State Association on this page. Read what your brother craftsmen of Kansas are doing. Look over the price list which they have adopted. If you haven't the advantages of an association-if you haven't the advantages of an agreed price listif you haven't complete harmony and co-operation among the craftsmen of vour vicinity write me and ask for my easy plans for forming branch associations. These plans will enable you to start an association in your county, to raise your prices to where they should be, and to get more than a mere living out of your craft. Of course, you want these advantages—they belong to you, you deserve them. You aren't expected to do work for little or nothing. Then take this means of getting what belongs to you. Let me have your request for plans today. Write right now. Address me P. O. Box 974, Buffalo, N. Y. You'll get the plans by return mail. THE SECRETARY.

The Meeting of the Blacksmiths' and Wagon-Makers' Association of Kansas at Manhattan.

Owing to the unavoidable absence of the president, W. I. Wolverton, the meeting was called to order by W. A. Pitman, of Manhattan, while E. D. Forney, of Cottonwood Falls, was elected chairman of the meeting. The local organization of Manhattan furnished some very nice music and singing, which was very much enjoyed by all present. Minutes of the previous meeting read and approved. Names presented for membership, since our last meeting, read. Reports of standing committee heard and approved. Special committee appointed to examine price list and report what changes (if any) should be made. Committee consists of the following: E. L. Rehkopf, Topeka; Sam

Allen, Valley Falls; E. M. Boyd, Wamego. The report was read and approved and committee discharged.

Appointment of a committee on a permanent order of business. Committee consisted of the following: M. I. Morgan, Eldorado; Sam Allen, Valley Falls; W. A. Pitman, Manhattan. Report as presented by committee: Call to order by the president: prayer; music; roll call by the secrereading of minutes of previous meeting; names presented of new members; reports of standing committee; reports of special committee; new business; unfinished business; election of officers at annual meetings; location of next meeting; good of the association; social entertainment; adjournment. Moved and carried that report be accepted and committee be discharged. Moved and carried that we adjourn until 7.30 P. M.

Meeting at 7.30 P. M. called to order by chairman. More music and singing. Moved and carried that the secretary be instructed to have published the rainutes of this meeting in The American Blacksmith. Moved and carried that there be a circular printed and supplied to the heavy hardware traveling salesmen to distribute among the trade, each circular to contain one application blank.

Nominations were now opened for our next meeting place on January 6, 1909. Emporia, Wichita, and Horton were nominated and a vote taken which resulted in a tie between Wichita and Emporia. There being a small girl in the meeting it was suggested that she vote the tie off, which she did and her ballot was for Wichita. Moved and carried that the Brooks Tire Machine Company, of Wichita, with the local blacksmiths and wagon makers of Wichita be appointed as a committee to provide a place of meeting and other entertainment for our meeting at that place on January 6, 1909, and notify the secretary (at least six weeks in advance of such meeting) of place of meeting and entertainment provided for.

Moved and carried unanimously that a vote of thanks be given to the blacksmiths and wagon-makers and people in general of Manhattan for the hearty welcome and royal entertainment given us at this meeting. Brother E. D. Forney was tendered a vote of thanks for presiding over the meeting in such an able manner. Adjournment.

J. M. BARNETT, Sec-Treas.

Brazing Cast Iron.

E. R. MARKHAM.

Mr. T. McMahon asks how to braze cast iron. Of course, he means gray iron. As I have had occasion several times to braze gray iron and have had uniformly good results I thought I would answer his question.

First the surfaces must be clean, then they must be drawn together and securely held by clamps, straps, or some suitable device. The surfaces are covered with borax and heated until soft brass will melt and run into the joints. It is useless to use brass with a high melting point, as the iron will melt as quickly as the brass and our work will be for naught.

I have found brass tubing to work nicely as it is generally made from soft brass, with a low melting point.

We must remember that cast iron melts at a temperature of from 2,100 to 2,300 degrees, which is very little, if any, higher than the temperature necessary to melt hard brass.

The brass may be filed with a bastard, or other coarse file, and the filings used.

There are many special compounds on the market for use in brazing cast iron, but I have never used one that worked any better than the soft brass mentioned above.



Don't run an automobile engine for any length of time in an unventilated shop. Exhaust gases are poisonous and are anything but healthful to inhale. If the engine must be run for any length of time open the doors and windows wide. F. B. G., Illinois.

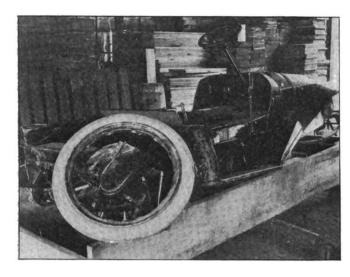
When dissembling any part of a car it is very easy to lose small parts. An excellent little stunt to guard against this is to make a shallow pan with four or more apartments partitioned off in it.

By sorting small parts into the pan, as they are removed from the car, little difficulty will be experienced in finding the proper nut or bolt for the proper place when you want it.

P. A. R., Ohio.

Getting in Touch with the Automobile.

A good plan for the general smith to adopt, where there is more than one-



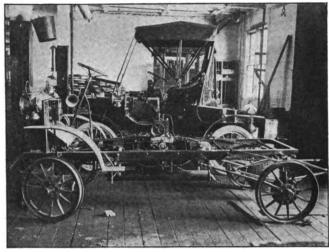
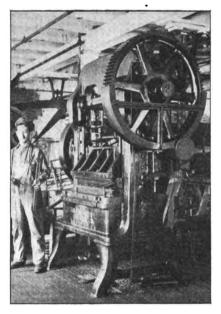


FIG. 1.—AN ACCIDENT RENDERED THE MACHINE ALMOST USELESS FIG. 2.—AN AUTOMOBILE THAT HAS SEEN FOUR YEARS OF SERVICE

smith in a shop, would be for one to run the shop during a slack time and the other to get a situation with some automobile firm, say, for a month or two; try and get in the motor assembling department or the frame assembling department. Or, he could take a job in any department, and by making the best use of his time, morning, noon, and evening, find out all about the machine. An ambitious man in that time could learn about all there is to know in taking an auto to pieces and putting it together again. There is not much use telling a general smith all about what he should do with the carburetor and what he should not do with the transmission. Not many general blacksmiths know anything about the mechanism of an automobile. Carburetors, transmissions, generators, coils, plugs, commutators, and the like are strangers to him. The man who buys an auto has all this to learn and he has an



ONE OF MANY PUNCH PRESSES USED IN ONE OF THE LARGEST AUTO **FACTORIES**

instruction book to learn it from. We will admit right here that the general smith is a little better than most mechanics, as the writer knows of more than one who fell down on learning the blacksmithing trade and afterwards made a fairly good machinist. But I am afraid if the average smith attempts to take an automobile all apart and put it together again in any reasonable time he would be like the fellow who took the watch to pieces and after putting it together had enough works left for another watch. A smith may work for years in an automobile factory and learn very little in regard to the general mechanism of the machine. unless he makes a special effort to find out at every opportunity he gets. Nearly every state in the Union has an automobile factory and every city of importance has a first-class garage, and a smith could not find a better place to get acquainted with the

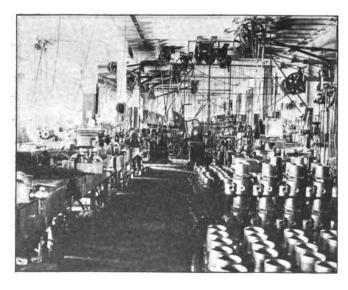




FIG. 4.—THE MACHINE SHOP MUST DO ITS SHARE

[FIG. 5.—THE FLY WHEELS AND CRANK SHAFTS ARE ASSEMBLED HERE

automobile than in one of these. If a smith is alone in business, he will find it will pay him to hire a man to take care of it for a month while he seeks the general information he finds necessary to hold his own in the repair line. It would be just as reasonable to expect a machinist to start a shoeing

an auto (the one in the foreground) that has been running for nearly four years. It has been from Michigan to California twice, and is now being overhauled for rebuilding, the intentions being to make a pleasure-party auto out of it to be used at one of Michigan's inland summer resorts. In a future

Then the machine shop, a small portion of which is shown in Fig. 4, is turning out its share, and truckers by the dozen are delivering the parts to where they belong. Fig. 5 shows parts of the department where the fly wheels are put on the crank shaft and tested. Fig. 6 shows one side of the frame





FIG. 6.—ONE AISLE OF THE FRAME ASSEMBLING ROOM

FIG. 7.—ANOTHER VIEW OF THE FRAME ASSEMBLING ROOM

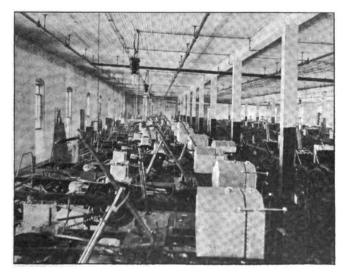
shop without first learning the art of horseshoeing. The automobile business is only in its infancy, so learn how to take an auto all to pieces and properly put it together again. Then if one comes into your place of business looking like the one in Fig. 1, you can tackle the job right.

The auto in Fig. 1 had not been away from the factory more than two

issue we will show this completed for its new occupation.

To an outsider thirty large automobiles per day seems almost incredible but nevertheless it is true. Observe the large punch press shown in Fig. 3. This is one of many used in one of the largest automobile factories in the world. In three separate operations this machine makes the entire

assembling room. This picture was taken during the noon hour and is only one side of the room. You can imagine what it would be like when full of busy workmen. Fig. 7 is another frame assembling room for a lighter style of auto. All these machines, after being assembled, are thoroughly tested and then sent to the gear painting shop, part of which is shown





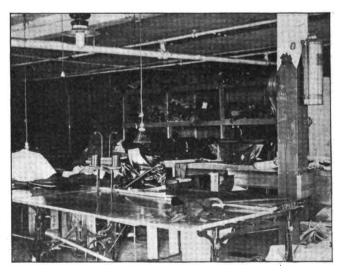


FIG. 10.—THE UPHOLSTERING DEPARTMENT REMINDS ONE OF A LEATHER STORE

months when it met with an accident that rendered it entirely useless. Three of the wheels had not a spoke left in them. One is shown resting on the rear mud guard. Fig. 2 shows hood of an auto. Just think of the number of hoods that can be made in ten hours by an operator. While this punch press is turning out hoods, others are turning out other parts. in Fig. 8. One would almost wonder how the men found their way around among the autos, they seem so thick. The frames stand just far enough apart to allow a man to go between

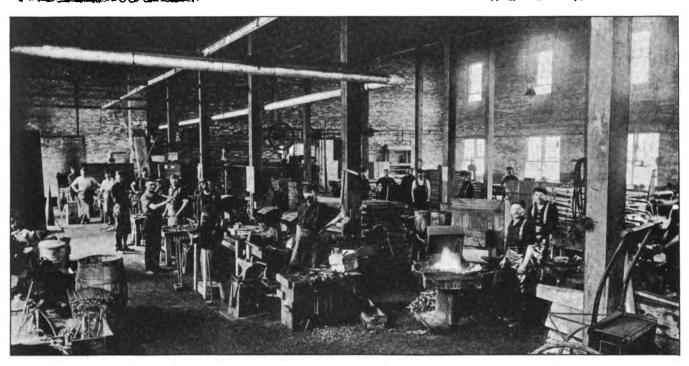
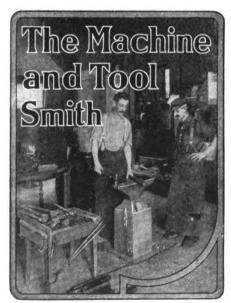


FIG. 9.—THE FORGING, BRAZING, CASE-HARDENING, AND TEMPERING ARE DONE IN THE FORGE SHOP

them. Fig. 9 shows the blacksmith shop where a great deal of the forging, brazing, case-hardening, and tempering are done. Fig. 10 is part of the upholstering department and looks like a wholesale leather store. Now, if a general smith served a month or so in any of the departments shown here he would be in shape to do business in automobile repairing along with his other work. Nearly all automobile firms need good men at all times and if he does not get a situation from the first one he writes to he need not be discouraged but try again.



The Sixteenth Annual Convention of the I. R. M. B. A.

The International Railway Master Blacksmiths' Association held its

Sixteenth Annual Convention at the Grand Hotel, Cincinnati, Aug. 18, 19 and 20. The attendance was as large as any previous convention ever held, and the secretary's report showed an increase in membership of twenty-three, and a substantial balance in the treasury.

The Honorable Leopold Markbreit, Mayor of Cincinnati, extended to the members a cordial welcome and the freedom of the city. Mr. W. W. Mc-Lelland of the association responded to his words of greeting.

During the discussion following the reading of the report on case-hardening, Mr. J. W. Smith, of Savannah, stated that he could case-harden link pins of any large piece of material, obtaining a depth of one-sixteenth inch in a half hour by heating them in the spring furnace and using ten pounds of cyanide of potassium to one and a half pounds of saltpeter in the powdered form. This statement brought forth a heated discussion; the majority of the members present asserting that it was impossible for them to get over one thirty-second or one sixty-fourth of an inch with the same method.

The following officers were elected for the coming year: President, J. W. Russell, Renovan, Pa; first vice-president, George W Kelly, Elizabeth, N J; second vice-president, John Conners, Montgomery, Ala; secretary and treasurer, A L Woodworth, Lima, Ohio; chemist, G H. Williams, Boston, Mass.; chairman of the executive committee, J. S. Sullivan, Columbus, Ohio.

Niagara Falls was chosen as the next

meeting place, that city receiving one more vote than Philadelphia.

Welding Brake Rods. ETHAN VIALL.

The accompanying engravings show how the jaws of brake rods are welded onto the bars, in the blacksmith shop of the Wabash Railroad at Decatur, Illinois. Fig. 2 shows some of these rods that have just been welded. Part of these rods have a jaw in one end only



FIG. 1.—THE MEN WHO DO THINGS AT THE WABASH SHOP

while the rest have a jaw on each end as shown. Fig. 3 is a view of the machine taken from above showing the separate parts in position to be welded.

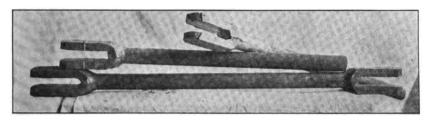


FIG. 2.—SEVERAL FINISHED RODS SHOWING PERFECT WELDS

The machine used is a powerful machine of the bolt-header type. Referring to the engraving, B is the stationary half of the die, while A is the movable half and C is the punch, D and E being the brake rod parts. In using the machine the end of E is first heated and upset as shown. Then both D and E are brought to a welding heat, D being quickly placed on punch C. and E placed in die B. The lever is then pressed down and jaw A advances and clamps E fast. Punch C then comes up and rams D onto the end of E, completing the weld at one stroke, no flux being used. Fig. 4 shows the punches used and also one side of die.

The two punches shown in the cuts are not fastened together as the picture seems to show. They are separate, but a small piece of iron was laid between them when the picture was taken. The upper part of die and the upper punch are used in making the weld, while the lower part of die and the lower punch are used to upset or scarf the bar.

The jaws of the brake rod are made on a pneumatic bulldozer. The straight pieces are heated and then bent into a U-shape by being pushed between two upright pieces.

Fig. 5 shows the machine in which the welding is done and also the oilheating furnace. The furnace is shown with four rods in place on which one set of jaws have already been welded. This furnace burns crude oil and consumes about 35 to 40 gallons a day. The pipe shown extending across the front at the top is a water pipe, and when the furnace is in operation jets of water flow down the front and flow finally into the funnel at the left. It takes about ten minutes to bring a piece to a welding heat, but a piece is put in whenever one is taken out and in this way no waiting is necessary.

Formerly this brake rod was made of three parts and two welds for each end, but C. E. Mitchell, machine-shop foreman and Joe Damm, assistant blacksmith foreman, got their heads together with the above result.

In Fig. 1 are shown from left to

right C. E. Mitchell, machine-shop foreman; J. C. Meehan, general foreman; Chris. Jackson, blacksmith foreman,

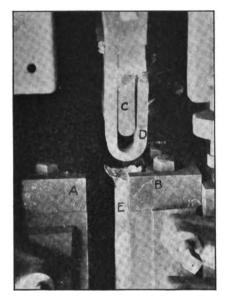


FIG. 3.—TOP VIEW OF WELDING MACHINE— BRAKE ROD PARTS IN POSITION

and Joe Damm, assistant blacksmith foreman. This group of men have had charge of the Wabash shops scarcely a year, but they certainly have made things hum in the repair line since they came.

An Old Apprentice Paper.

"This Indenture, made this fourth day of April, 1881, by and between William Gorman, of the City of St. Louis and State of Missouri, of minor years, of his own free will and consent of John Gorman, his father, which are testified by their signatures, heretofore affixed, of the first part and Peter Duckermont, of the same city and state as aforesaid, of the second part:

"Witnesseth: That the said William Gorman, of his own free will and with consent of his aforesaid father. John Gorman, has bound himself to the said Peter Duckermont as an apprentice to learn the trade of wagonmaker, and hereby agrees and binds himself to faithfully serve and perform all the duties of an apprentice to him, the said Peter Duckermont, in said business, from the date hereof, for the period of three years, and shall and will in all cases keep his master's secrets, work to his master's interests and benefit, and obey. perform and do all lawful requirements of him, as such apprentice, by the said William Gorman as to his master. In consideration whereof, I, the said Peter Duckermont, on my part, agree and bind myself to furnish to the said William Gorman at all times and seasons food and attention and to teach him the said trade of wagonmaker as fully and completely as the same may

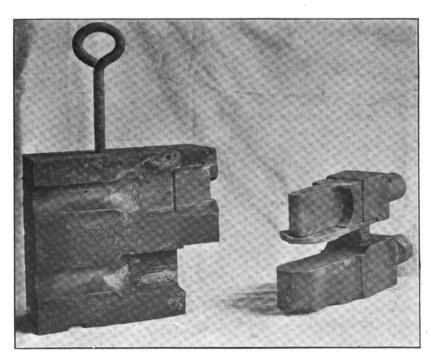


FIG. 4.—DIES AND PUNCHES THAT ARE USED FOR SCARFING AND WELDING

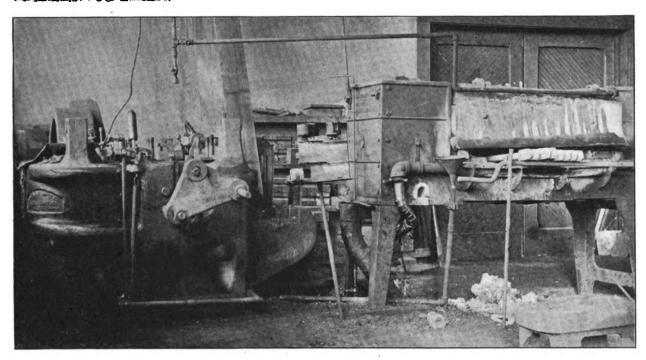


FIG. 5.—SHOWING THE HEATING FURNACE AND THE WELDING MACHINE IN THE WABASH SHOPS AT DECATUR

be in the power of the respective parties to teach and receive, and that the said William Gorman will receive during the period of the said three years the sum of Two Hundred Dollars (\$200.00), to be paid in the following installments: the first year fifty dollars, the second year sixty dollars, and at the end of the third year the balance remaining unpaid, and all said sums to be paid in equal installments at the end of every six months.

"In testimony whereof the parties have hereunto set their hands and affixed their seals the day and year above written.

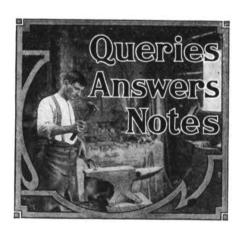
Done in the presence of
Thomas Campbell.
Signed in duplicate
Peter Duckermont,
John Gorman."

The Evolution of the Plow.

The plow is one of the most important as well as one of the most ancient of civilization's implements. As an agricultural implement it is the most universally used and heads the list in importance.

The history of the plow goes back to the time when primitive man first thought of aiding nature in the production of his food. This first plow was a forked stick sharpened at one end. By forcing this sharp end into the ground and pulling it along the first plowman managed, after a fashion, to turn the soil. As time went on, various changes, additions and alterations were made, until we find a

contrivance made of wood and pointed with iron. The iron point was a good one, it didn't wear as the wood did, so that the next step was a cast-iron plow. And from drawing a forked stick through the soil and turning but a mere excuse for a furrow, we today find giant steam plows turning twelve and more furrows at one and the same time.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants to Temper Dies.—Would some brother kindly tell me through Our Journal the best way of tempering dies after recutting them? J. F. V., North Dakota.

To Make a Trotter Pace.—I would like to know how to make a trotter pace. I have tried thirty-two ounce shoes behind and four ounce in front with no result. Kindly tell me through The American Blacksmith. John Lar, Connecticut.

What Would You Do?—What can be done with a horse's hoof where the outer wall parts from the inner, the inner side growing a great deal faster than the outer wall. In other words the ground surface of the foot grows down faster than the wall.

JOSEPH HESS, IOWA.

A Brazing Flux.—Mr. McMahon asks for information as to brazing cast iron. I must say that I have had excellent luck with a mixture of equal quantities by weight of common salt and common borax. I have done first-class jobs of brazing with it.

J. B. Blanchette, Mass.

A Note from South Africa.—I should like to add my humble testimony to the great benefit The American Blacksmith has been to me. I have found in each number something that helps one considerably. I shall do my level best to induce other members of the trade to subscribe. H. H. Lobey, Cape Colony.

To Temper Hammers.—In answer to Brother S. A. Flynt, who wants to temper hammers, my method is this: Dress your hammer, then heat to a bright cherry red; take a pair of tongs and hold in the eye. Then with an old coffee pot pour water in the center of the face of the hammer in a constant stream until it is cold. You will then find a temper on your hammer that will stand. T. C. Selsor, Kentucky.

How to Make and Temper Rock Drills.—Draw your steel down to the width required but not too thin. Make the cutting edge oval shaped, not square, and then take about three gallons of soft rain water, no other, put in a good handful of salt and then add a pint of sharp cider vinegar. Mix well, run the temper to a light straw color, do not dip your steel too deep and you will succeed. H. L. Griswold, New York.

On Welding Axles.—Tell Brother Cronin, of Illinois, to weld his axles up the same length between collars as he desires the track from out to out of face of spoke, after deducting from said track the distance

from butt of box to face of spoke of each wheel added together. If the face of his spoke stands plumb his track will be absolutely correct. L. Van Dorin, Cal.

To Temper Hammer.—Mr. S. A. Flynt wants to know the best way to temper hammers. Heat to a light cherry red, catch in center with hot tongs. Cool each end gradually, keeping eye hot, rub with brick or emery to brighten. As temper runs down to face, cool center of face with wet cotton or rag, keep center straw color and let the edges get a dark blue, then cool off. The pene should be dark blue. Keep the eye soft. W. H. Gunn, Virginia.

About Brazing.—Noting a request from a brother subscriber from South Africa on how to braze cast iron, would say that this is part of the trade every smith should know, especially those engaged in general repair work. I have experimented along this line of work for a good many years. I have made with tests broken castings and they have proven satisfactory. I will gladly give my experience to any smith interested.

J. C. Acker, Ohio.

Several Questions are Asked.—Can some brother blacksmith tell me through the columns of The American Blacksmith what kind of material to use to temper plow lays and cultivator shovels? I have some preparations, but they don't work just right and so I would be pleased to get some information on the subject. Would also like to have someone tell me how to make a foot power hammer, and



THE GENERAL SHOP OF CAMERON BROTHERS OF VICTORIA, AUSTRALIA

also a bicycle or foot power emery wheel stand.

C. F. RICE, Iowa.

Wants More Information.—I noticed in the Journal how to make a small trip hammer by William F. Martinek. I would like a little clearer idea of each and every part. As given, the spring on the upper end of lifting rod is six inches long. Is that the extreme length or is that the length from the yoke to the hammer beam? How does the tightener lever work? What size

is the anvil and hammer head? What are they made of and how fastened to the beam and anvil block? Will Brother Martinek please oblige me with this information. W. O. Humphries, Louisiana.

He Wants Suggestions.—I shall be very pleased if the brothers will oblige me through "Our Journal"; I should like to have suggested some specialty or specialties that could be made up in a fair-sized country shop. Something not heavy or costly to prepare that would be in fair demand at fair profit. Most of us have some little pet specialty going out (I have one; barrow wheels), but there is not much demand for them in my district. So if the brothers will say what they are doing, or give a suggestion that I can act upon they will be thanked most heartily.

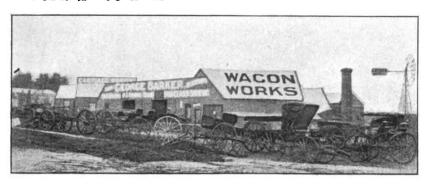
GEORGE ROBINSON, New Zealand.

To Shoe the Nervous Mule.—I would advise my brother smith to get a strap \$\frac{1}{4}\$ or \$\frac{1}{4}\$-inch wide and long enough to go round the mule's head. Have the strap padded to an inch thick at one part, to go in the animal's mouth. Now, bring strap over the head and behind the ears and buckle it as tight as possible. Let him stand 10 or 15 minutes, then loosen strap and go to work. If he does not stand quietly, repeat the dose. Don't be afraid if he does sweat, it won't hurt him. Charge the owner 35 or 40 cents per hour while you are doing it, it will put a little brains in him and help much. \$\[\begin{array}{c} J. M., New York. \end{array} \]

That Buggy Problem.—In answer to Will O'Gorman, of Missouri: An agent sold two buggies for \$100 each, on one he made 20 per cent and on the other he lost 20 per cent. Cost equals 100 per cent; 100 per cent less 20 per cent equals 80 per cent; 80 per cent equals \$100. One per cent equals \$1.25, 100 per cent equals \$1.25 cost of buggy on which he lost 20 per cent. \$125 less \$100 equals \$25 loss on one buggy; 100 per cent and 20 per cent equals 120 per cent, selling price on the one he gained on. 120 per cent equals \$100, 1 per cent equals \$.83\frac{1}{3}\text{, 100 per cent equals \$83.33\text{ cost of buggy he gained on. \$100 less \$83.33\text{ equals \$16.66\frac{2}{3}\text{ gain on second buggy. \$25 the loss on one buggy less \$16.66\frac{2}{3}\text{ gain, equals \$8.33\frac{1}{3}\text{ loss on the transaction.} E. H. PORTER, Kansas.



A PILE OF SHOES TEN FEET FOUR INCHES HIGH AND TWO FEET NINE INCHES IN DIAMETER, COLLECTED IN TWO YEARS BY CAMERON BROTHERS OF AUSTRALIA



THE WAGON AND CARRIAGE WORKS OF MR. GEORGE BARKER OF AUSTRALIA.
MR. BARKER ALSO DOES SHOEING AND GENERAL WORK AND SELLS WINDMILLS

Shoeing for Pitched Ankles.—In reply to Mr. J. W. Austin, of Tennessee, he may use a shoe made in the manner shown by the engraving. The shoe should be turned at the third-nail hole and welded and a low calk at rear to give full frog pressure. He will be very agreeably surprised how the ankle will be relieved by the first shoeing.

G. A. MILLAR, Nebraska.

To Correct Forging.—An Emery Stand. In answer to Mr. Porterfield's inquiry regarding how to shoe a horse that forges, would say I have paid quite a little attention to this point in shoeing and have had very good success. I shorten the toe of the front foot reasonably short and leave a long toe on the hind foot and lower the heels as much as possible. This retards the back action. In a very obstinate case I put a roller motion shoe on in front and a toe and no heel calks behind. As to second question, how to shoe a stifled mule or horse, and will say that I have had but little experience in this line. I have a crescent emery stand for general use and don't see how one could be made any better.

John Armstrong, Illinois.

Another Problem.—"A little nonsense now and then is relished by the best of men." A customer came into the shop to have a horse shod. While we were doing the job we talked on different subjects to pass the time. Finally he asked if we would do the job on the following basis: He would pay us one cent for the first nail we drove, two cents for the second, four cents for the third, and so on, doubling the price of each succeeding nail until the job was finished. I told him we would be glad to take the job on those terms and would be willing to throw in two or three good farms to boot. Now, we want some one who is good with a pencil to figure out how much we would get for shoeing the horse. I have the correct answer and will send it in after the brothers have figured on it a while. Sharpen your pencil. P. V. Burgess, Mo.

Blacksmith and Hardware Prices.—I would be pleased to answer W. H. Lehman, of Texas, through "Our Journal" in regard to the retail hardware man selling goods at a price that the blacksmith has to pay for his stock. We all find that true. And the reason is, the hardware merchants are organized and can buy the goods at a better price than the blacksmith. So I ask Brother Lehman to get busy and organize his State and let's work towards a National Blacksmith Horseshoers and Wheelwrights' Association for 1910 and possibly we will be able to buy goods at the same price as the hardware merchants. Another thing, the jobber charges the blacksmith for drayage at the starting point, which they do not charge the hardware merchant. The unorganized blacksmith is an easy mark for the jobbing house. Get busy now. T. H. Chadwick, Nebraska.

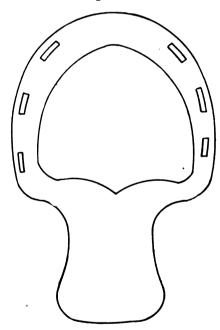
To Temper a Claw Bar.—In reply to Mr. Van Alstine's inquiry, heat your claw bar a very low red for a short distance back of your claws and dip it in the following solution and keep it moving around, not holding it in one place. Submerge the whole of the heated bar in the solution and hold it there long enough to cool the claws. Now, polish the claws. A piece of hot iron of liberal size will aid you to draw your temper. Draw your temper to a low blue. Never over-heat your steel, because over-heating for tempering such things as claw bars is the seat of all trouble. This is the solution into which to dip your bar: one quart of salt (fine salt preferred); two ounces of ammonia; four ounces of borax (pulverized), and twelve gallons of BILL KELLEY, Connecticut.

A Few Points on Brazing.—I wish to reply to Mr. T. McMahon, of South Africa. He asks for information on brazing cast iron. I will endeavor to open the problem for him that he may understand it. The first step to brazing cast iron is to see that the part to be brazed is free from all dirt or grease. Second. clamp the two pieces together so there will be no give to them. Third, have a good clean fire. Fourth, heat slowly. Fifth, when at a good cherry heat sprinkle with fine powdered borax. Then add your spelter or brass whichever you may have and as you see it begin to melt, shut off your blast and remove the casting from the fire or let it remain for a few moments in the fire. I wish to say that there is a vast difference in castings. Some will unite easily with the brass while other pieces are almost impossible to braze. C. W. METCALF, Iowa.

Treatment for Pitched Ankles.—I will try to give instructions on relieving pitched ankles in answer to the inquiry of Mr. J. M. Austin, of Tennessee. Pare the heel as much as advisable. If the animal knuckles over put a tip on the front of the shoe from one half inch to as long as you see fit to hold the foot back. Then pin-fire light on the enlarged part of the tendon or apply a caustic blister as you prefer. Follow with creolin lotion to bathe the affected parts three times a day and give plenty of light exercise. If this fails you will have to build a draw brace to draw the ankles back a little each day until the desired results are obtained. If you do not understand pin firing get your veterinary to do it for you. I have had fair success with the above method. I learned to do pin firing from a veterinary surgeon. John M. Hodgens, Arkansas.

A Letter on Shoeing .- I am twenty-eight years old and have had ten years' experience in horseshoeing. I have bought lectures from the most up-to-date horseshoers in the United States. I would be very glad if every man in the United States had to have a license before he would be allowed to shoe a horse. Work is cheap here. I get eighty cents for shoeing. There is a man in the neighborhood who shoes for sixty cents, and I shoe ten to his one. I have got an up-to-date shop; do all kinds of work, but some men think if they have an old chipped anvil, a round-faced hand hammer, an old claw hammer, and an old worn-out rasp that they can shoe a horse all right. These men make it hard for the man who can shoe to treat a horse properly. I think all the poor horseshoers ought to be knocked outbe forced to stand examinations. The man that can shoe horses cannot shoe a horse as cheap as a poor shoer will. He cannot afford to. W. W. Abney, Alabama.

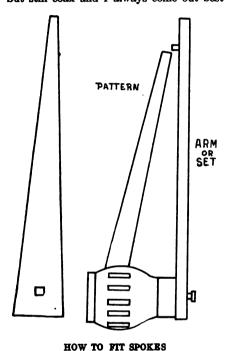
On Measuring Tires.—I see an inquiry from Sawyer, a brother smith of Iowa, about measuring tires. Will say, the best way I have ever found yet is first to bend the bar, then trace your wheel, counting the turns of the trace wheel till you get to the starting point. Then mark trace wheel, take your already bent tire, trace it from end counting turns of wheel to the



SHORING FOR PITCHED ANKLES

length of measurement of wheel. Cut off your bar, then according to the amount of draw you want to give the wheel, and you will never have any trouble. To roll the wheel on the bar before it is bent will always make your tire three times the thickness of the bar too short. If any brother smith has a better way than I have described, would be glad to hear from him through our paper. We have been in the craft twenty-five years and have a large shop, equipped with the New Way gas engine, a power blower, a band saw, two drills, a grinding machine, a shelling machine and two forges, and do a general blacksmith and carriage business. work with the assistance of two to five men. Lytle & Morris, West Virginia.

Shoeing Nervous Mules.-I want to say a few words to Brother George Nablo, of Ontario, and his advice to Brother Alex Fritz, of Pennsylvania, regarding the nervous mule which the owner won't allow being shod in the stocks. Blankets, chloroform, and the like is all nonsense. I am a shoer at the mines here where we have lots of bad, nervous mules. Some that want to stand on their heads at the least noise. We have stocks here, but have found that when once shod in stocks it is very hard to shoe them without. When I shoe an extremely nervous mule, I have silence in the shop, then I coax it and pat it and speak gently but firmly. If he is not willing to stand then, I put a twitch on him, but still coax and I always come out best



with very little trouble. I must say a few words of praise about your good paper. I have been a subscriber but a short time, but it will be a long time before I quit. I find that once a month is not often enough. I find lots of useful kinks and ideas that help me considerably.

STANLEY GRIFFITH, Pennsylvania.

The Buggy Problem—Price Lists.—In regard to the profit and loss problem, I wish to say that four of the answers were correct and one whose answer was five dollars was wrong. The correct one is eight dollars and thirty-three and one-third cents loss.

Those price lists are certainly amusing to me. I once started to make a price list for my own use in catalogue style, indexing it, but I did not get far advanced as I found it to be pretty much of a job. I got tired and gave it up. What's the matter with someone getting up such a thing as that? It would be very useful, as some of us who do a variety of work cannot always remember just what to charge for some things and have not the time to look up our cost prices and do some figuring, as we have to work at the bench. Some of our brothers are very harsh on each other. They call them cheap Johns, etc. Those same parties get some of their work by being cheaper than some one else. WILL O'GORMAN, Missouri.

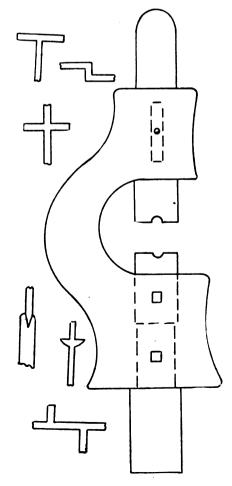
A Florida Price List.—After reading THE AMERICAN BLACKSMITH I find it very good and like it very well. But I don't think that you have Florida prices adjusted just right. We get 50 cents per foot for shoeing in all of the towns but Tampa. Buggy tires we set for 75 cents each; half rims 75 cents; spokes 15 cents each, and we charge 75 cents for the tire when we put in spokes. One-horse wagon tires are set for 50 cents and 75 cents each; rims same as buggy rims and spokes also the same. Twohorse wagon tires are set for \$1.00, spokes 25 to 40 cents each, rims \$2.00 to \$4.00 per wheel. For new one-horse wagon tires we get \$6.00 per set; new axles, 11-inch axles and smaller, \$7.00 per set; shafts, each \$1.50; iron welds, each 50 cents; cross bar, 75 cents to \$1.00; singletrees, 75 cents to \$1.00; one wooden axle, \$3.00 to \$5.00; bolsters, \$2.00 to \$3.50; tongues, \$3.50 to \$4.00; doubletree, \$1.50; front hounds, \$4.00; hind hounds, \$3.50; pointing plows, 50 cents to \$1.00; sharpening plows, 15 cents to 40 cents; welding buggy springs, \$1.50; wagon-seat spring, 65 to 75 cents each; shoeing, plain all around, \$2.00; resetting, \$1.50. L. G. Hockersmith, Fa.

How to Fit Spokes.-In the August number Mr. R. Elmo Harris, of Tennessee, wants to know how to fit the mortises in hubs so his wheels will not go back (I assume he means wood hubs). Glue a plug in the hole in the front end of the hub. Make a set or arm two feet, six inches long out of a piece of hard wood and trim it wide at one end, one and a quarter inches at the other, and seveneighths inches thick. Put a half inch-laz screw through the wide end of the set, and screw it into the plug in the hub. bore a hole in the other end of the set about where the felloes go on the spokes, put in a wooden pin by which to drive the spokes. Now make a pattern of a spoke out of a thin piece of wood two feet long. Taper it on the back side the length of the tenon on the spoke. Now see if the pin in the set is right for the dish you want. Crowd the pattern down into the mortise in the hub and see if the front edge of the pattern comes fully up to the pin without pulling. If the pattern pulls away from the pin, dress the line of the mortise in front of hub so the pattern will come up to the pin. After getting the mortises right, fit the pattern to them. Then dress the tenon on the spoke according to the pattern with the drive necessary to make a good fit. Be sure the tenon fills the mortise at the lower end. If it doesn't, the wheel is no good. I make buggy wheels with 1-inch dish, and do not draw over any with tires. For heavy wheels allow for a f or 1-inch dish which is none too much. A. E. CARR, New York.

A Talk on Anvil Swages.—In the January number of this year was shown an anvil swage, of my design, and as the artist shaped the head of the tool it was not very strange that Mr. W. H. Morris found fault with it, as he did in the March number. The accompanying engraving shows a larger sketch. This shows it more in detail and some samples of what can be done on it. Mr. Morris says, "The head will become swollen from the blows and

will give trouble." Now, I will say that I have demonstrated by several years' use the practicability of this tool and Mr. Morris ought to know that if the head was shaped like his own it would give no trouble. I am not looking for trouble or am I finding fault with another's work or productions, but I will say a few words in regard to Mr. Morris' swage. It has always been a point with me never to use a spring on any tool where a vibration is caused by a shock or blow, as from a hammer. The result is a break sooner or later. This tool is costly to make and has a limited range. My experience has taught me that no matter what kind or how good the quality of steel or iron used the result is the same. Another fault with Mr. Morris' swage is in forging a short piece which reaches only part way through the dies. The result is a taper, caused by the twisting of the spring as there are no guides to hold the dies in place. Then also a square shoulder D. FOSTER HALL, Mass. is impossible.

An Interesting Craft Letter.—I enjoy the articles found in "Our Journal." I have no kicks to make. I enjoy all the shoeing articles, although I do not follow this line very much. I also enjoy the auto articles, but do not do any repairing. The articles on brazing are interesting to me, as I do considerable work along this line. The articles on the repair of buggies, wagons, and farm implements of various kinds strike me right. The articles on gasoline engines I certainly enjoy. I am "engine-struck," yes, so hard I would quit the business if I had to go back to the old way. It is the surest and cheapest helper you can employ. It is always ready and all the pay it asks



A TALK ON ANVIL SWAGES
Digitized by

is to keep it clean. Do your part and it will do the rest. With my engine I do all my woodwork and drilling. I have two rip saws, one hand jointer, and one wood shaper. I made a wood lathe and an emery stand, and the jig saw which I made is so rigid that I can saw any kind of wood four inches thick. It is one of the strongest machines of its kind in the country. I have been using it for six months and have never broken but one saw. If I had time I would give a description of it to the craft. It is easy to make and the cost small; any smith can make it. I made all of my machines except the jointer head.

I have the best-equipped shop in the country and a large territory of customers. My motto is, "Never turn down a job however difficult it looks, and never tell a customer you can do a good job when you know you have not got anything to build on." Always tell the truth, even if you lose a job; make your customers have confidence in you. It is the best advertisement you can you. It is the best advertisement you get. If you do this you need not be afraid for your work. I to charge a living price for your work. I once had a customer that wanted the very best work that could be done, but it had to be cheap or he would grumble I did a job for him that amounted to twenty dollars. He thought me too high. He paid fifteen dollars down and said he would pay the balance as soon as he could, if my conscience would not call it even. I told him my family had to have a living out of my labor. In a short time he came with another job. I wasn't very well prepared to do that job at that time. I advised him to take it to another man and let him do all he could do on it. He did it and brought it back to me to finish. He paid a good price for what he had done before and he found out a part of it had to be done over, for which he had to pay me extra. I finished the job and made my charges and when I did he remarked that it was a good job and cheap enough, and he proved his sincerity by squaring up his old account. My experience tells me to be fair with myself and my customer—a fair deal all around. John C. Allred, North Carolina.

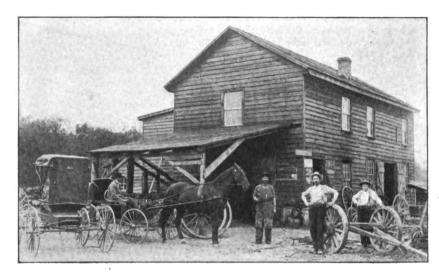
DRILL SHOEING Forge FLOOR STOVE HORSE SHEAR Stock TIRE SHRINKER FORGE DISC MACI ARBOR GRINDSTON GAS ENGINE

FLOOR PLAN OF AN IOWA SHOP

A General Shop of Iowa.—The accompanying engraving shows how I have the inside of my shop arranged. My shop is twenty-four feet wide and sixty-six feet long. I use a Royal blower and have three International upright engines which I can recommend to anyone needing an engine.

I have done very little brazing, though I have done several good jobs; some were cast jobs. I would like to know if it is necessary for me to get a brazing forge to do the auto work. I have been using my forge for all the work I have done so far.

J. R. McLane, Virginia.



A GENERAL SHOP OF VIRGINIA

My shop is very convenient for myself, but might not be for anyone else. I have been here for eighteen years and have a very good trade. There are two other shops here. This town has eight hundred and fifty inhabitants, but we have a very thickly settled country around us. I am a reader of The American Blacksmith; could not get along without it very well, as I get very much interested in the way the different smiths are doing. J. S. Shultz, Iowa.

A Letter from Virginia.—I live in a little town of about seven hundred inhabitants. We are coming to the front as a town. The accompanying engraving is a picture of my shop which is twenty by forty feet, two stories high, with a two-story shed sixteen by twenty feet with the engine room attached to the shed. I have a very good roomy shop. When I came here six years ago there were two shops here. The older smith said he had money to burn, but he is gone now. The other shop is closed about four-fifths of the time and I expect it will close up entirely most any old time. I want to say right here that I attribute my success to the reading of THE AMERICAN BLACKSMITH.

I have some very good tools and expect to continue to buy good tools as long as I stay in business. I have a Hay-Budden anvil, one Mole tire setter, one House cold-tire setter with punch and shear attached, one Barcus shoeing stock, one gas engine with which I run a wood lathe, one circular saw, and a drill. I am at work on a band saw machine now. Will soon have it in. I also have a tire-bolting machine which I find is good. I keep two men busy besides myself.

I always try to teach the boys that to make a success they must work their brain as well as their muscle. I like our paper and the letters from everybody. I am very much interested in the auto department and also in brazing. I must say that

The Trade School.—I have been a reader of The American Blacksmith for some years and notice that the trade school talk is quite common. In the July issue the author of "The Failures and Successes of an Apprentice," states that the only place for a boy to learn his trade is in some trade school.

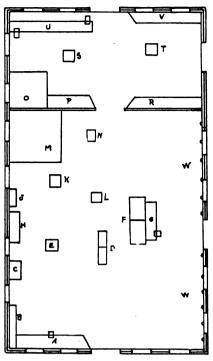
Now, I have been a blacksmith for fifteen years and have been foreman in a large railroad shop for the S. P. R. R. for seven years and in that time have had two cases of hiring blacksmiths that learned their trade in some school. They were not blacksmiths at all. They had not worked an hour before every smith, apprentice and helper in the shop knew they were not smiths, so they were let out. For when a shop hires a smith they do not intend to teach him his trade at blacksmith's pay.

Now, if you ask me if that is the way to turn out a young man, I will say no. It is an injustice to the boy as well as to the trade. He should be turned out so that he could go into any shop and master the work. It may be I do not understand the intentions of these schools and would enjoy a letter from the writer of article signed, "An Old Timer," in the July issue.

But speaking from experience, I think the schools are a failure, for these young men will be making a failure of life as long as they try to follow the trade of blacksmithing.

C. N. C., Nevada.

In reply to the criticisms made by Mr. C. on the trade schools, I submit the following: I don't in the least doubt Mr. C.'s assertion in regard to the two men from the trade school. I have seen men who never went to a trade school hire out as first-class blacksmiths when they were hardly first-class helpers. It seems foolish to me for men to try to put up such a bluff. It seems to me, however, that Mr. C. has been a little hasty in his judgment on trade schools. We cannot determine the



A GENERAL SHOP OF NEBRASKA

character of a man by one or two acts in his life, whether they are good or bad, neither ought we to judge an institution by one or two of the men they send out.

One reason why I think the trade school is of advantage to the apprentice is that it familiarizes him with different kinds of work. How many smiths, who learn their trade in a forge shop, can go into a job shop and shoe horses or iron carriages or go into a machine shop and temper steel and give satisfaction? Are they even familiar with that class of work? I have often heard the expression when talking with a tool maker, "I do my own tempering." "What! do you not keep a black-smith?" "Yes, we keep a blacksmith and he is all right on forgings but he doesn't understand steel."

Why is it that some macnine shops employ a machinist to do the tempering and send their forgings to be done outside. The manager will say, "We haven't forging enough to keep a man at work all of the time and it is so difficult to find a blacksmith who can work steel that we don't keep any." Now what can we do to recover the work that belongs to us but has been taken from us and given to another trade? What remedy better than the trade school can be given that will do justice to the man and preserve the honor of the craft?

A General Shop of Nebraska.—The accompanying engravings show a picture of my shop and also the floor plan. The building is sixty feet by thirty-six feet with a room thirty-six by forty feet for smithing and a wagon shop twenty by thirty-six feet. We have plenty of light and fresh air as the windows are all of good size and the doors are double. The equipment consists of a seven horsepower Alamo engine, a Little Giant trip hammer, an emery stand, a Skow disc sharpener, a large power drill, a set of Little Giant screw plates, a tire shrinker, a tire bender,

and a tire-bolting machine. We have three fires with a Peter Wright 172-pound anvil and two Trentons of 150 pounds each.

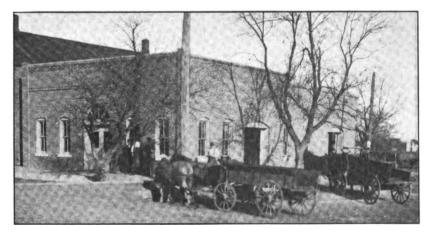
The floor plan shows the location of our various machines, tools, and articles of equipment. A represents a work bench with a vise: B is a rack for horseshoes. This rack is made of half-inch rods and fastened to the wall. C is a forge; D represents the tire bender and also the tire shrinker; E is the trip hammer; F is a double forge, a bench, G, running across both forges. This bench holds a vise at one end and a Neverslip machine on the other end. H is a work bench; I is a bolt rack; K, the emery stand; L, the drill; M is the office and engine room; N, the disc sharpener; O, coal bin; P, rack for iron stock; R, rack for wood stock; S, wheel block; T, circle saw; U, wood-worker's bench with two vises as shown. This bench is away from the wall so that two men can work on opposite sides of it. is a rack for spokes of all kinds and WW the shoeing floor. Bud DITMAN, Nebraska.

An Interesting Letter from Oklahoma.-I am located in the very southwestern part of Oklahoma, your new sister State. She is young but not very small in population. You ask subscribers for their opinions and suggestions. I think "Our Paper" is the very best and I like your plans for the future. As to the kicker of some time ago I am not like him, I get plenty of horseshoeing in each paper. If he will study all that is written each month he will have all he can digest. But this country is free and he has a right to register his kick the same as any one of our readers. That is O. K .- I like his style. If one doesn't like anything, don't get behind anyone's back to say it. Be square with the world. Honesty, straight forwardness, and to do the best you can, I think, is the backbone of our trade.

I read everything that is published n "Our Journal," whether it has a direct connection with my line or not. I am over five hundred miles from any part of how to repair them. There are very few of those machines around here, but one might happen to have a chance and 1 would need to know. I am at a small country postoffice and the nearest shop to me is nine miles and the next nearest is twelve miles. There are very few good smiths in this county and none that are first-class. There are a few things that I cannot do, so I don't claim to be a good smith. I try to do almost everything, and in what I attempt, I do the very best I can. I have never advertised at all and do not know what effect it would have on my trade. As it is, I run three forges nine months in the year and two the other three months. In these three months, three fires cannot be kept up, so if I were to advertise it would be for help.

I say, let our paper come as you have outlined it. If I study its pages as they are printed, I'll get a dollar's worth out of every paper that I receive. So don't look for any kick on this end of the line for the "line's busy," and no time to kick.

I almost forgot my side lines and my different kinds of smith work. I do plow work of all kinds, wagon and buggy work, horseshoeing, and almost any kind of brazing. We use Weldarine. We brazed a cog the other day for my sixteen-horsepower threshing engine that weighs three thousand pounds. The wheel was thirty inches in diameter with a 3½-inch face, one arm and the rim were broken. It is now as solid as new. I run an independent thresher rig in season. I always try to take the place of any of my men so that if any of my men get sick or quit, we can go ahead just the same. Consequently, I am able to run an engine, or separator, or to cook a meal for twenty-five men that is palatable and in as short a time as anyone. There is only one thing that I do claim to be pretty good at and that is on binder work, having served as expert for six years. I can do a little work at the tinner's bench if called on and for a little recreation, I can get on a good horse and



A WELL-BUILT SHOP OF NEBRASKA

the Gulf of Mexico and have never taken the time to visit a seaport, but I am interested in ship smithing, because I might possibly be connected with the ship building or repairing business some day or other.

The automobile repair line I am not directly interested in, yet, I like to know

lasso a long-horned Texas steer, throw him and tie him down myself. I don't want to kick, but I would like to make four men of myself sometimes so I could keep up.

P. G. KILDOW, Oklahoma.

A General Shop of Maryland.—I like "Our Journal" very much, and seeing so

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many letters and engravings of shops I thought I would send you a picture of our shop. I have been blacksmithing for forty years at this same place, and am now sixty-six years old. For the last eighteen years my son-in-law and I have been running this blacksmith and wheelwright shop which is twenty by fifty feet and two stories high. We are kept busy all the time. We will give you a few of our prices:

\$1.00
. 80
. 10
1.50
. 25
6.50
2.50

Sharpening cultivator shovel, set	\$1.00
Pointing cultivator shovel, set four.	2.00
Pointing cultivator shovel, set six	2.40
SICKLE REPAIRING.	
Welding sickle bar	\$.50
Welding piece in sickle bar or new	-
end on	.75
Filling sickle 5 feet	.40
Filling sickle 6 feet	.50
WAGON WOOD WORK AND REPAIR	ING.
Wagon Wood Work and Repair Wagon axle 31 inch and under	
Wagon axle 31 inch and under	
Wagon axle 3½ inch and under Wagon axle over 3½, advance for	
Wagon axle 31 inch and under	\$ 3.50
Wagon axle 3½ inch and under Wagon axle over 3½, advance for each ½ inch	\$ 3.50
Wagon axle 3½ inch and under Wagon axle over 3½, advance for each ½ inch Wagon bolsters (old irons and standards) each	\$3.50 .25
Wagon axle 3½ inch and under Wagon axle over 3½, advance for each ½ inch Wagon bolsters (old irons and standards) each Sand board	\$3.50 .25 2.00
Wagon axle 3½ inch and under Wagon axle over 3½, advance for each ½ inch Wagon bolsters (old irons and standards) each	\$3.50 .25 2.00 2.00



A GENERAL SHOP OF MARYLAND, RUN BY DELAPLANE AND FOX

Agreed Price List of the Kansas Association. SHOEING.

SHUEING.	
New shoes No. 4 and under, per set	\$1.50
New shoes No. 5 to 7, per set	2.00
Bar shoes, per pair	1.50
Resetting shoes, each	.25
Trimming feet, per foot	.05
PLOW WORK No. 1 SOFT CENTE	R.
Fourteen-inch plow share	\$4.00
Sixteen-inch plow share	4.25
Fourteen-inch lister share	4.00
Sixteen-inch lister share	4.50
Subsoilers, flat	1.00
Subsoilers, wing	1.25
Cultivator shovels, per set, old backs.	3.50
Sharpening 14-inch plow shares	.45
Sharpening 16-inch plow share	.50
Pointing plow shares	1.00
Sharpening lister shares	.60
Sharpening subsoiler	.10
Pointing lister	1.25
Polishing plow or lister\$1.00 to	1.55

Tongue hound, per pair	2.00
Wagon tongue at the rate of \$1.00 per	
inch or 31 tongue \$3.25 and 31-in.	
tongue \$3.50, etc.	
Wagon reach	1.25
Sawed rim on front wagon wheel	1.75
Sawed rim on hind wagon wheel	2.00
Bent rim on front or hind wagon wheel	2.00
Wagon cut down 14 x 21 rims	10.00
Wagon cut down 1½ x 2 rims	9.00
One to three spokes in wheel, each	.25
More than three spokes in wheel each	.20
More than three spokes in wheel each One to three piece felloes in wheel,	
each	.35
	.30
Bottom in wagon bed including cross	
piecesBottom in wagon bed without cross	5.00
Bottom in wagon bed without cross	
pieces	4.00
Wagon double tree, wood only	.50
Wagon single tree, wood only	.25
Wagon neckyoke, wood only	.35
BUGGY WOOD WORK REPAIRING	3.
Buggy or spring wagon wheel rim	\$1.75
Buggy or spring wagon pole (iron	
work extra), each	3.50
Pole circle	1.25
Buggy or spring wagon reach, pair	2.00
Buggy or spring wagon single reach,	
pair	1.25
Buggy shaft \$1.75 and up.	
Cross bar in shafts	1.25
Buggy doubletree	.75
Buggy singletree	.50
Buggy spring bar	1.00
Buggy head block	1.00
Axle bed \$2.00 to	2.50
Plow beam	2.50
Plow handles, per pair (round and	
irons extra)	1.25
Plow rounds, each	.25

Description No. 0 Comment	
PLOW WORK No. 2 CRUCIBLE.	
Fourteen-inch plow share Sixteen-inch plow share	\$3.50 3.75
Fourteen-inch lister share	3.50
Sixteen-inch share	3.75
Subsoilers, flat	1.00
Subsoilers, wing	1.25 .25
Sharpening 12-inch plow share Sharpening 14-inch plow share	.30
Sharpening 16-inch plow share	.35
Pointing plow share	1.00
Sharpening lister	.50
Sharpening subsoiler	.15 1.25
Pointing lister Sharpening cultivator shovels, per set	1.20
of four	.50
Sharpening cultivator shovels and	~-
trim, per set of four	.75
set of six	.75
Sharpening cultivator shovels and	1.00
trim, per set of six	1.00
DISC AND DISC MONITOR WORK	
New disc runners, each	.50
Disc knives sharpened, each	.15
Sharpening disc 16-inch, each	.20
Sharpening disc 18-inch, 20-inch, each	.25
Sharpening monitor disc, each	.25
Babbiting monitor disc box Monitor disc pin	.25 .25
Disc plow sharpened	1.00
BUGGY, CARRIAGE, AND WAGON REPA	IRING.
Buggy-stubs 1 inch and under, set	
Spring wagon stubs 14, 14, set	8.00
Thousand mile stubs extra, set	1.00
Heavy stubs $1\frac{3}{8}$, per set	10.00 12.50
Heavy stubs 12, per set	15.00
Ruggy tire 1 inch and under set	6.00
Spring wagon tire $1\frac{1}{3} \times \frac{1}{3}$ inch, set	6.50
Spring wagon tire 11 x 16 inch set	7.00 7.50
Spring wagon tire $1\frac{1}{8} \times \frac{1}{4}$ inch, set Spring wagon tire $1\frac{1}{8} \times \frac{1}{16}$ inch set Spring wagon tire $1\frac{1}{4} \times \frac{1}{16}$ inch, set Spring wagon tire $1\frac{1}{4} \times \frac{1}{8}$ inch, set	8.00
wagon tire 14 x 4 inch, set	10.00
Wagon tire 14 x 4 inch. set	11.00
Setting tires up to including 11 x 8,	2.50
per set Setting tire $1\frac{3}{4} \times \frac{1}{4}$ inch, set	3.00
Setting tire 17 x 7 inch, set	4.00
Setting tire 4 inch, per set	6.00
Bolster plate	.50 .75
Wagon skeins 3 inch and under, set	6.00
Wagon skeins 31 inch, set	7.00
Wagon skeins 31 inch, set	8.00
Setting buggy or spring wagon axle.	1.00 .50
Welding pole brace	.50
Shaft sockets, each	.75
Pole sockets, each	1.00
Bow sockets front or back, each	.75 1.00
Bow socket main or middle, each Solid Rubber Tires.	1.00
Solid-rubber tires 1-inch tread, set	2 1 <i>R</i> 00
Solid-rubber tires 1-inch tread, set.	18.00
Solid-rubber tires 1-inch tread, set	20.00
Solid-rubber tires 14 inch tread, set	27.00
Solid-rubber tires 1 inch tread, set.	32.00
Solid-rubber tires 1 inch tread, set Solid-rubber tires 1 inch tread, set	35.00 40.00
CUSHION RUBBER TIRES.	10.00
Per set of wheels of which hind wheels	
are 44-in. high, 1½ tread	\$ 30.00
Per set of wheels of which hind wheels are 44-in. high, 11 tread	35.00
Per set of wheels of which hind wheels	00.00
are 46-in. high, 11 tread	40.00
Per set of wheels of which hind wheels are 46-in. high, 11 tread	42.50
Resetting tire 1 inch and under, each	1.25
Resetting tire 11 inch and over, each.	1.50
All pieces of rubber tire, per lb	.75
Work by Hour.	
Machinery work, per hour	\$.50
er or power	1.00

Herbert Jenner, patent attorney and mechanical expert, 608 F St., Washington, D. C., established 1883; I make an examination free of charge and report if a patent the exact cost. Send for circular.

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are made from tough, durable, lively NEW RUBBER. Quality is the first consideration. Our "Wing" Tire will outwear several ordinary rubber tires. The wings (see cut) keep water, sand and grif from working between the channel and the tire, to wear out the tire from underneath. Write for particulars.

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The Best Yet

Best High-grade Steel. Hard, Thorough Temper. Sharp Cutting Edge. Sharp, Strong Teeth, Well Backed.

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Made in all regular sizes, and in the new 18 inch Slim, which gives the user the advantage of a long stroke, = and at the same time a rasp of medium weight. ==

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To Make a Strong, Clean Weld if You Use Perfection Welding Compound.

We invite you to give our Compound a thorough test, and will ship any amount to any address for that purpose. If it does not prove just as represented we pay all expenses.

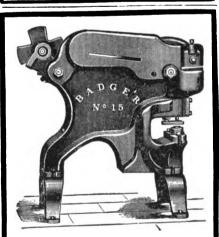


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PUNCHES and SHEARS

A complete line of both hand and power machines for every purpose. Our combination punch and shear especially designed for the general

Write for Illustrated Catalog and Price List,

ROCK RIVER MACHINE CO. Janesville, Wis.

Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, Sept. 25, 1908, and are subject to fluctuations, Corrected for The American Blacksmith by The National Heavy Hardware Reporter,

Correspondents report no changes in prices. Not-withstanding the factory reduction in the price of poles and shafts, jobbers would make no change in their quotations, as present prices afford little profit on this line, Common malleables have also seen a reduction in cost but prices will remain as quoted,

All Iron Shoes	\$4.40 4.25
No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	
Mule Shoes	4.90
Featherweight Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Ideal Countersunk	6.00
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
Track Weight.	9.50
E. E. Light Steel Steel Driving.	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50
Merchant Bar Iron—	

\$1.90 to \$2.10 rates full extras, and 20 cents per 100 pounds extra for broken bundles.

Steel Bars— \$1.90 to \$2.10 rates, full extras.

Toe Calks- Blunt Sharp													•	box \$1.30	
Cambana B	20140														

Carriage Bolts— 6 x i and smaller Larger and longer.	.:	::	:	 	:		 :	· •	:	.60-10% 50%
Machine Bolts— 4 x 1 and smaller . Larger and longer.		::		 	:	• •				.60-10% . 50%

Nuts— Less than 10 lbs, of a From 10 to 50 lbs.	a size	\$2.50 of 3.00 of
Washers-	Skeins-	

came price as a ac.	00 /0
Malleables— Common \$.09	Half Patent Axles —
Springs— Single Spring, each Springs, black and half	\$1,25 bright \$10

Hickory Lumber- 1 to 2½ 2½ to 4½	-Per Fo	ot— · · · · · · · · · · · · · · · · · · ·	\$.09½ 11
Ash and Oak Lur 1-1-1 1-1-2	nber—Pe \$.07½ .08	er Foot— 21-3	. \$.081
Yellow Poplar Lu	mber—P	Per M. Feet-	

renow Popiar Lumber-	-Per M.	reet-	
·	6 to 12	13 to 17	18 to 24
	\$6 5.00	\$65.00	\$75.00
1 ″	65.00	68.00	80.00
1	68.00	75.00	85.00
[*]	72 00	80.00	104.00
Rough Hickory Axles-	-		Each.
3 x 4 6 ft			. \$.60
31 x 41 R ft			1.00

31 x 41	6	ft .																	1.00
4 x 5	6	ft .																	1.20
5 x 6	Ř	ft .																	2.20
	٧.																		
4 x 5	64	ft.					٠.												1.30
44 x 54	67	and	7	ft															2.00
	~ * *		÷		•••	•••		•	٠.	•	•	•		٠	٠	٠	٠	•	
5 x 6	62	and	7	It	٠.,				٠.										3.00
5½ x 6½	7	ft.		•	•	٠.		•		•	•			٠		•	•	•	3.50
Finished H	lick	ory A	\x	les	<u>-</u>														\$1.00
TOL 72 8	uu.	27 B	M C		٠.	٠			٠	٠.		٠	٠				٠	•	₽1. ∪
For 3 S	kei	ns																	1.20
For 31 8) Kei	DS									_								1.4

Finished Hick	kory	A	хk	es	_													
For 21 and	12	\mathbf{s}	tei	n	١											\$.00	
For 3 Ske	ins					٠.											.20	
For 31 Ske	ins	٠.							٠.								.4.	
For 31 Ske	ins								٠.								.60	
For 31 Ske	ins	٠.															9.	
For 4 Ske	ins		٠.		•	٠.	٠	 •	٠.	•				•		2,	2	
Rough Oak E Short 12-14-16 f			٠.				:	 :		:		•	:	•	:	\$.08 10.	Ē

For 4 Skeins	2.2
Rough Oak Bolsters— Short	
Finished Oak Bolsters— 21 x 31 and under	.70
Rough Oak Wagon Tongues—	

Short	\$.08 .09
Finished Oak Bolsters— 21 x 31 and under 3 x 4 3 x 4 1	.70
Rough Oak Wagon Tongues— 4 x 4 x 2 x 4 x 12 and smaller	\$1.00
Finished Oak Wagon Tongues— 31 and smaller	

I WO I nch Sawed Flounds	Per Pair.
Tongues	\$.40
Front	. 45
Hind	
Patent Wheels-	
	40 %
A. B. No.13 and under	30 %
All Grades, No. 17 to 33	35-5 %
All Grades No. 39 and Larger	20 <i>6</i> %
All Grades, No. 39 and Larger	∴ 35-5 %
Cupped Oak Hubs- Set. Plain End Oak	Hubs-Set.

Cupped Oak Hubs-	Set.	Plain End Oak Hui	bs-Set.
7x8x9	\$1.10	10 x 14	\$2.90
7 x 9 x 10	1.10	11 x 14	3.60
8 x 9 x 10	1.35	11 x 15	4 00
8 x 10 x 11	1.50	11 x 16	4.50
9 x 10 x 12	1.70	12 x 16	5 00
9 x 11 x 12	1.75	12 x 17	5.50
10 x 12 x 13	2.60	13 x 18	6.25
11 x 13 x 14	3.65		
12 x 14 x 15	4.50		

	Rough Sawed Felloes-		
	14 x 2 " \$1.55 14 x 24" 1.75 14 x 24" 1.85	2 x 2½"	2.0
ı	1 x 2 x 2 x 1.75	$2\frac{1}{2} \times 2^{-1} \dots$	4.
į	$1\frac{3}{4} \times 2\frac{3}{4}^{\prime\prime} \dots 1.85$	3 x 3 "	5.3
i	3 x 3½"	6.00	

Ironed Poles. White, XXX— 1	\$4.00 4.00
Ironed Shafts, White, XXX— 1 " x 2 " and smaller	\$2.15
1½ x 2 " 1½ x 2½"	2.35 2.90

1 x 2 " and smaller	\$2.15
1½ x 2 " 1½ x 2¼"	2.35
1½ x 2¼"	2.90
Farm Wagon Bows—	
Round Top, 4 x 2 "	\$.65
Flat Top. x 2 "	.80
Round Top, { x 2½"	1.40
Standard size Piano Bodies with Seats-	
Each	\$4.25

Standard size Piano Bodies with Seats— Each	\$4.25
Plow Beams— 1 Horse	
2 Horse	.85 1.00
	_

All Hickory and Oak Spokes and Patent S Discount from Weis & Lesh List No. 5.. Wagon Neck Yokes-

_		Mixed	White
	Forest	Second Growth	Second Growth
$21 \times 38''$.	\$2.15	\$ 2.95	\$4.25
2 x 38" . 2 x 42" . 2 x 46" .	2.90	4.05	5.50
2 x 46".	4.40		
3 x 44".	4.70	6.95	8.90
3 x 48".	5.50	7.85	10.50
ingle Trees-	-Oval-	_	
		Wired	W/L:4-

S

		Mixed		
	Forest Se	cond Grow	th Second Growt	h
21	\$ 1.60	\$2.90	\$3.50	-
2 7	1.70	2.95	3.60	
21 21 21	1.80	3.05	3.80	
3 x 36"	2.45	3.55	4.20	
3 x 38"				
3 x 40"	2.65	4.00	4.85	
ingle Trees	-Round-	- Fore	et Second Growt	h
2}"		\$2.	10 \$3.60	
21		2.	10 3.65	
2		\$2. 2.	15 3.75	

3	3.45	4.80
Oval Plow Doubletrees-	Flat Plow	Doubletrees-
2 x 36" \$1.75	1 x 3 x 3 x	x 42" \$3.00
3 x 40" 2.55	• •	•
Wagon Doubletrees-		

2 x 4 x 48"	\$3.60
21 x 48"	4.80
21 x 41 x 50"	5.20
21 x 41 x 52"	5.60
21 x 5 x 52"	6.40
2½ x 5 x 54"	7.20
Mixed Second Growth 50 % ad	vance
White Second Growth 100 % ad	vance
Oval Plow Singletrees—	orest
21 x 30" and under	\$1.00
21 x 30" and under	1.25
Buggy Doubletrees—	

uggy Doub	letrees-	-	
		Mixed Second Growth	White Second Growth
21" and smaller	\$2.65	\$3.65	\$4.60

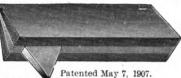
Express	Doubletree	5—-	
•		Mixed	White
	Forest	Second Growth	Second Growth
217	\$2.95 3.55	\$3.65	\$5.00
21"	3.55	4.15	5.50
2'"	2 55	4 20	2 75

Express	Sing	detrees.	Turned-	
•			Mixed	White
		Forest	Second Growth	Second Growth
21		\$2.50	\$2.65 3.65 4.00	\$3.75
217		2.90	3.65	4.00
91"		2 (0	4.00	4 7E

Express Sing	detrees.	Square Center-	_
•		Mixed	White
	Forest	Second Growth	Second Growth
21"	\$3 .00	\$4 . 15	\$ 5.25
2 <u>1</u> ″	3.50	\$4.15 5.45	6.00

Buggy Neck	Yokes-	_	
	_	Mixed	White
	Forest	Second Growth	Second Growth
2 x 42"	\$2.75	\$ 3.15	\$4 . 5 C
21 x 21 x 42"	3.15	3.75	5 4F





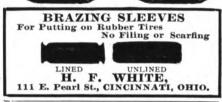
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eel tire on and ubsbored	86 and 40	88 and 40	40 and 44	axles and boxes set
\$7.00 7.25 7.50	15.25 16,75	15.55 17.05	15.85 17.35	2.25 ·· 2.50 ··
	wheels ith flat eel tire on and ubs bored \$7.00 7.25	wheels and rub heel tire on and ubs bored \$7.00 7.25 7.50 16.75	wheels ith flat eel tire on and ubs bored 40 \$7.00 \$13.95 \$14.15 7.50 16.75 17.05	wheels the flat eel tire on and hubs bored end tire on and ulsus bored 40 40 44 \$7.00 7.25 15.25 15.55 15.85 7.50 16.75 17.95

1½ | 9 00 | 24 75' 22.50| 26.25| 2.75 H. P. Repair wheels, \$5.00. We will rerubber your wheels for \$7.35 Five sets or more one order, you can deduct 25°. Per set as freight allowance. Write for Catalogue. We manufacture wheels with Steel or Rubber Tire on 3-4 to 4 inch treat. Buggy Gears with wheels and shaft all ready for body, \$18.50. Buggy Shafts (treesd) \$1.65. Felse \$2.55.

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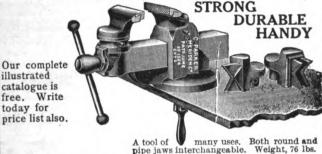


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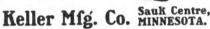
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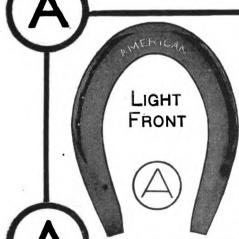
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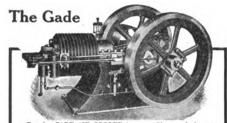


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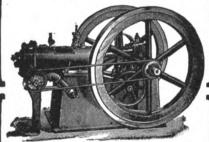
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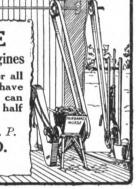
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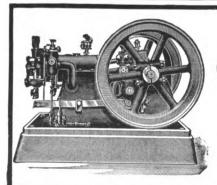
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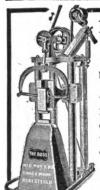
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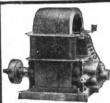
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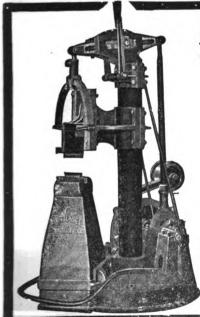
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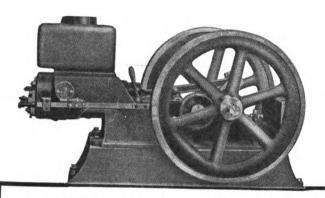


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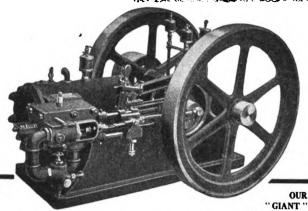
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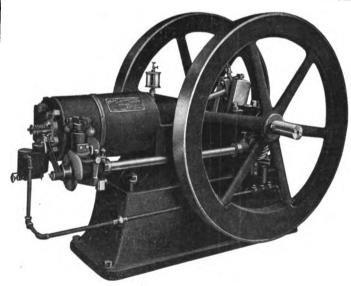
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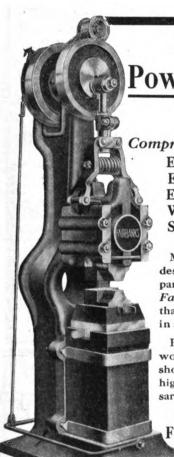
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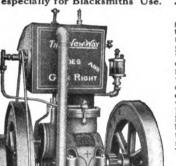
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Look at the other engines first, Note the multitude of rods, springs and triggers described as simple. Remember that the water tank (always left out of the cut) has to be filled and emptied every winter day. To forget it once may mean a ruined engine. Remember that water cooled engines all have packed cylinder heads. Packingleaks and blows out. Inevitable trouble and loss of power smettime.

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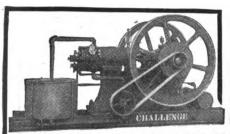
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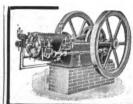
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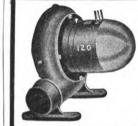
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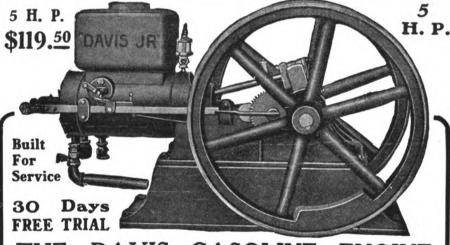
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good; it's away out of the ordinary, and you will.

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Trade Literature and Notes.

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The entire working parts of the hammer are at the top in full view of the operator and every part is readily accessible. It can be easily operated by any one with a little practice. The machine is built in all required sizes ranging from twenty-five pound up to two hundred-fifty pound ram. The compactness and durability of this hammer will readily be appreciated by the trade. Any one desiring a well-illustrated and attractive catalogue of this machine should write to the Fairbanks, Morse & Company, Chicago, Ill.

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New Books.

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This book by the Editor of the Gas Engine Magazine explains the care and operation of gas and gasoline engines, how to avoid and overcome difficulties in operation. The chapters contain information on fuel supply; starting; fuel consumption; ignition; timing, two chapters on illustrated troubles; lubrication; condition of engine indicated by noises.



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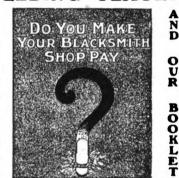
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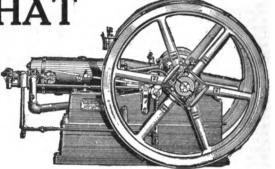


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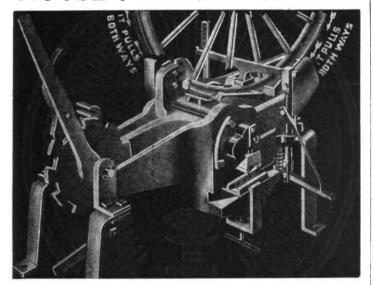
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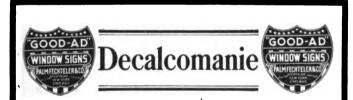
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Before it was invented cold tire setting was known to be a failure, and without it, it would still be, so if you buy any other you will regret it. But with it one man has taken in fifty dollars in a day single-handed, and was out nothing but his day's work. One single machine has earned its owner \$7,000.00, and is still in good order. Hadn't you better get yourself one? They are sold cheap and on easy terms. They will be put in on trial where parties doubt their doing the work or would like to try them in competition with any other cold tire setter.

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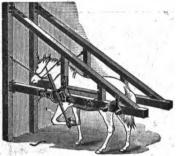
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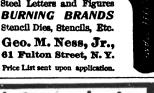
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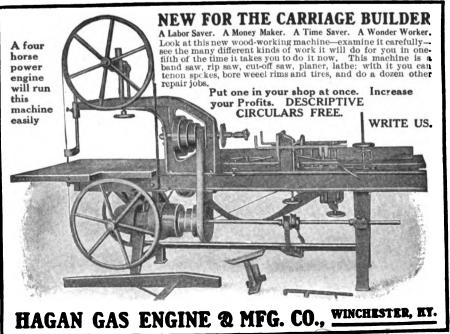
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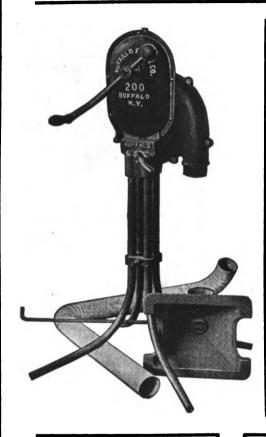
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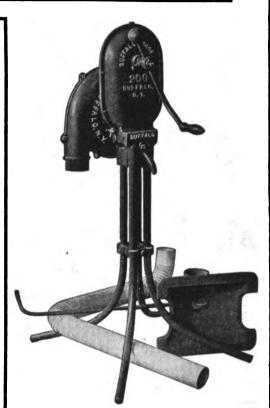
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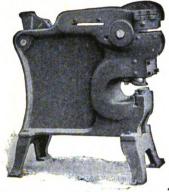
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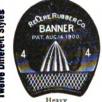
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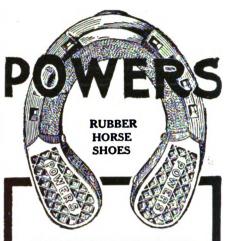
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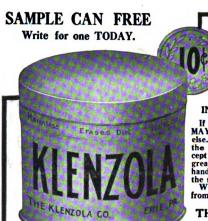
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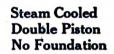
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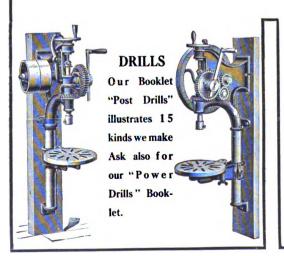
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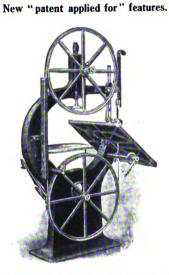
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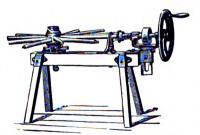
SILVER'S NEW JOINTERS Five sizes—8, 12, 16, 20 and 24 inch.



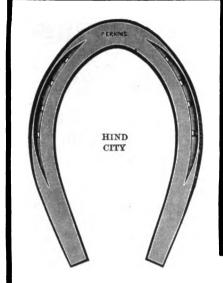
SILVER'S NEW BAND SAWS

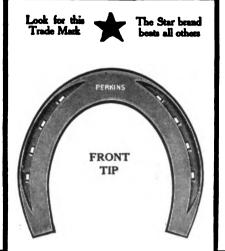
Four Sizes—Patented tilting device for table—All parts easily reached by operator—New ratchet foot power device on 20 inch machine.

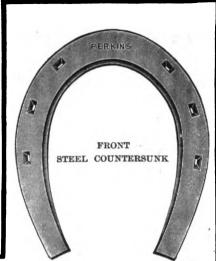




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Seven Sizes, Fitted with Star Hollow
Auger. Rigidly constructed.



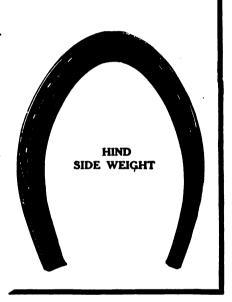






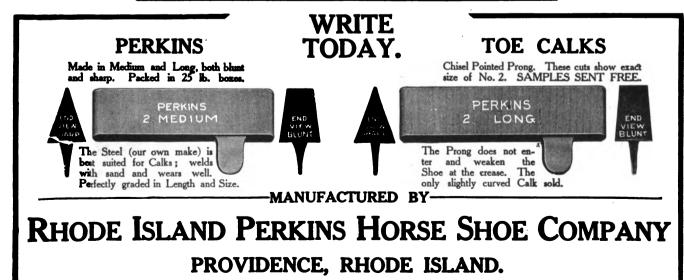
★PERKINS★ HORSE SHOES TOE CALKS The SUPERIOR Kind

Have more points of superiority than any other make. An upto-date shoe for upto-date Blacksmiths.

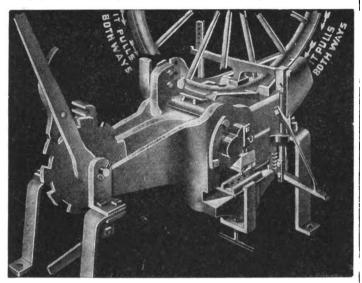


Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern Hind City and Steel Countersunk. Free for the asking. We gladly send

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HOUSE COLD TIRE SETTER



This is the Machine that won out.

Before it was invented cold tire setting was known to be a failure, and without it, it would still be, so if you buy any other you will regret it. with it one man has taken in fifty dollars in a day single-handed, and was out nothing but his day's work. One single machine has earned its owner \$7,000.00, and is still in good order. Hadn't you better get yourself one? They are sold cheap and on easy terms. They will be put in on trial where parties doubt their doing the work or would like to try them in competition with any other cold tire setter.

HOUSE COLD TIRE SETTER CO.

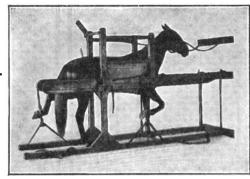
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Strong Will Last a Life-

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Shoes The Vicious Horse

in 20 Minutes

With these stocks the most vicious horse can be shod in twenty minutes without any risk to man or beast. When not in use stocks fold against the wall and occupy practically no room. Our shoulder rope secures the horse instantly so that he can't get away. The horse cannot lie down, rear or pull back with our fastenings. The feet are held firm and taut by a flexible mechanism; no dangerous vise-like foot hold; Impossible to injure or break a horse's leg. Two feet can be shod at the same time. Quick and easy to operate, easy on the horse and no strain on the shoer. In releasing horse you simply pull a lever and the sling drops from under him. These stocks have been tried and tested for years, and are used by the United States army. Write for descriptive circular, price list and testimonials. Terms and prices liberal. You do not pay for the stocks until you have thoroughly tested them to your own satisfaction.



A NEW WAGON COUPLING WITHOUT A KING BOLT

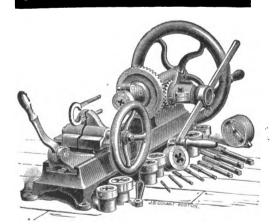


Prevents wearing of Reach, Axle Tree and Sandboard, the weak place in a wagon. Easily attached to any wagon at small cost. With this coupling wagon will last twice as long. Made exclusively by Hemphill's Horse Stocks Company. Wagon manufacturers and blacksmiths investigate.

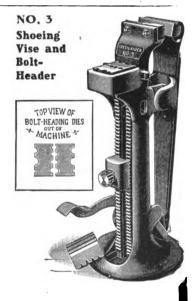
THE HEMPHILL HORSE STOCKS COMPANY RENSSELAER, INDIANA, U. S. A.



GREEN RIVER MACHINES that **EVERY** Blacksmith should possess



No. 20 Bolt Cutter



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Get the World's Best Horse Clipping Machine

We make over 90 per cent of all the clipping machines used in the world. interested in power machines, write for catalog showing everything in electric or other power clipping outfits



Many blacksmiths and shoers make big money by clipping horses. Why not do it in your shop?

The gears of this machine are not cast like a poorly constructed imitation on the market. They are all cut from the solid steel bar and made file-hard. In fact, every wearing part of this machine is as hard and tough as skill and science can make them. Every gear is all enclosed, protected and swims in oil. Friction and wear are reduced to the lowest possible point. There is 6 feet of high grade flexible shaft, so all parts of the horse are reached easily. The knife is the famous Stewart one-nut pattern, known all over the world as the simplest and most perfect clipping knife ever made.

We guarantee this machine to please you, or it may be returned, and we will refund every cent you paid out. We make clipping machines as low as \$5, but this is the best one by all odds made anywhere at any price.

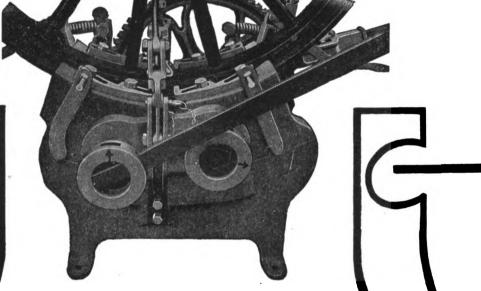
DO NOT CONFUSÉ this splendidly constructed, perfect working machine with trashy imitation machines. Notice the strong, substantial tripod base on this machine as compared with other contraptions; the upright is heavy and substantial, the gear case is compact, there are no cast iron gears in it as in imitation outfits. In every sense it is built for wear and good service. It is substantial in every respect, and will do better work and last years longer than any other clipping machine ever offered.

It Will Pay for Itself Several Times Over Every Season. Send \$2 and we will ship C. O. D. for the balance. Your supply house has it.

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THE TIRE SETTER for your shop. It will increase your tire-setting capacity, build up your tire trade by doing better work, and make larger profits for you. Made by the longest established builders of edge grip tire setters in the world.

The great improvements and practical features of the **Brooks** make it the best cold tire setter on the market. The Draw-heads move in a circle with the wheel, and upset the tire without kinking it. The Draw-heads of other machines move in a straight line, which often straightens or kinks the tire where it is upset. Our Grip key device is a necessity to keep the keys from slipping and bending the tire edgewise. Other machines are without it. With our patented segment plates, the **Brooks** fits wheels of large and small diameters equally well. With other machines lacking these segments this is impossible.

Our machine is well protected by patents. It is built right and tested for years in some of the largest shops in the country. You take no risk when you buy it; the long established success of the **Brooks** is a guarantee of satisfaction. It will save you time and money and please your customers. You lose by being without one.

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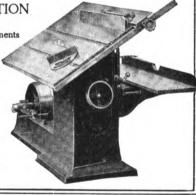
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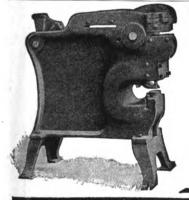
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COMBINED PUNCH NO. 5 AND SHEAR.

Punches 5% in. hole through 5% in. iron. Shears 5 in. x 1/2 in. flat iron bars. Shears 114 in, round iron bars, Shears 8 in. x 1/4 in, band iron.

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in. wide, 14 in. high 14 10 er set of 4, 16 pounds. This shows the strength of our STANDARD as compared to the old style.

Bruce Malleable Wagon Standard

Tested thoroughly and guaranteed strictly as represented. he great advantages of The Bruce Malleable Iron Bolster Standard over the old style.

r. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers.

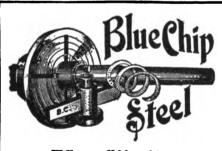
It is attached to bolster by means of two bolts passing through bolster from a superfectly sole to be from top to bottom of bolster, thus holding standard perfectly sole and a the same time strengthening end of bolster, which in old style is weakened by some time strengthening end of bolster.

3. The Malleable Iron Standard has a 3 r-2 in. face at base which prevents wear on wagon box, while the old style has only a 7-8 inch face.

4. Great time saver. Can be attached to bouster in one-fourth the time required to put on wood stake. Adapted to new and repair work.

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Will turn off blue chips on any kind of work.

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wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during yourbusyseeson would pay for itself in full.



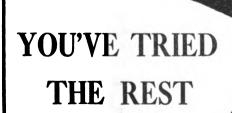
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They're made of stuff that cuts

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The Guarantee we give you with our Machine is as good as a U.S. Gold Bond.

We are so far in advance of other machines in improvements that we really have no competitors. Gillette Machines give satisfaction in every way.

Our claim is as broad as words can make it. The Gillette Clipping and Grooming Machine is better than any other Clipping and Grooming Machine in every particular.



The Gillette Machines were the first Horse Clipping and Grooming Machines made in any part of the world. Many imitations have been put on the market, but none have ever reached our high standard.

Send for our 1908 catalogue and read about our New Patent Chain and Grooming Brush.

THE GILLETTE CLIPPING MACHINE CO.,

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THE O. K. STOCK FOOD COMPANY, 650 Monon Building, CHICAGO, ILLS-

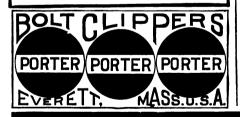
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The neatest, best looking, strongest, easiest and quickest to apply, and in every way the best standard ever offered for sale.

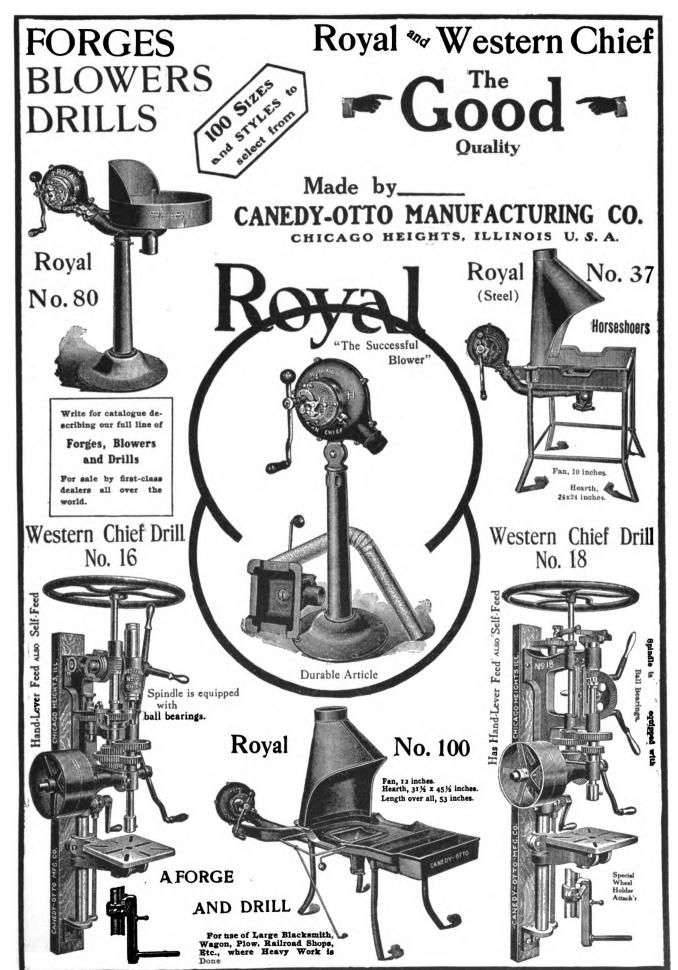
Made in but one size and will fit any size of bolster. It's never necessary to trim the bolster to get a fit. Can be applied in twenty minutes—simply bore three holes and bolt on. Will pay a better profit with less work.

Price, \$1.65 per set of four standards. Cash with order. Ask your supply house for them or write us.

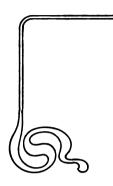
National Wagon Standard Company,

BEMENT, ILLINOIS.









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OUR CALENDAR is 8 x 9½ inches in size and is finished in ten colors, as natural as life. The date pad is of convenient size and the whole calendar is on good, heavy cardboard, making an extremely beautiful as well as useful calendar.

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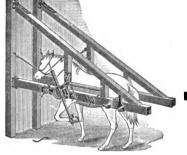
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Relieves you of all danger and permits you to do careful, proper work. This pleases your customers and helps business. The time saved and the more satisfactory work done by the use of BARCUS STOCKS makes the price look small. Thousands in use throughout the country. Write today for our illustrated catalog try. Write today for and full information.

READ what your brother Shoer says about BARCUS STOCKS:

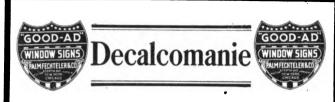
Geo. Barcus & Co., Wabash, Ind, Gentlemen: The Stocks are the Candy. It does not only please me, but it pleases my customers and is worth the money. I use it almost every day.

Yours very truly, F. W. MEIER, Upper Sandusky, O.

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The Most Powerful Hand Machine Made One operation of the lever does the work. No changing required

One man on the lever cuts 1-2 x 4 in.

Punches 5-8 in, hole in 1-2

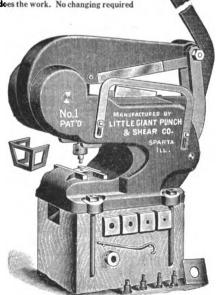
5 punches and dies with each machine.

Extra punches and dies, 50c each and guaranteed.

Hundreds in use by the U. S. Government, Contractors, Manu facturers, Mechanical Schools, etc.

It is the BEST tool for the Blacksmith Shop for which it was especially designed. Made in three sizes.

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BLACKSMITH TAPER TAPS.



The Great Race Meet at Charter Oak Park

FALL OF 1908 -

The people were there Labor Day 50,000 strong!
The fast horses were there and won large purses!
"CAPEWELL" nails were there and held the horses' shoes!

Shoe worn

by "The Eel"

the Sensational

O

Pacer, 2:021/2

Gentlemen:—I shod the sensational pacer "The Eel," before his start in "The Nutmeg" (Charter Oak Park, Sept. 8, '08), which race he won in 2:05, 2:05\frac{1}{4}, 2:05. He is shod with 6 oz. shoes in front and 3 oz. shoes behind and No. 3 "Capewell" Plate nails hold them securely.

This summer I have shod six horses that have beaten 2:04: Highball 2:03\frac{3}{4}, Baron Gratton 2:03\frac{1}{4}, John A. 2:03\frac{1}{4}, Gallagher 2:03\frac{1}{2}, Copa de Oro 2:03\frac{1}{4}, The Eel 2:02\frac{1}{2}.

I use "Capewell" nails on all horses I shoe—have used them for years—and I find the other shoers on the Grand Circuit are all using them this year.

FRED KOPE.

Winner

"The Nutmeg"

> \$5,000 Purse

Sept. 8, 1908

"The Eel" wears 6 oz. shoes in front and 3 oz. shoes behind.
They are always held with No. 3 "Capewell" Plate Nails.

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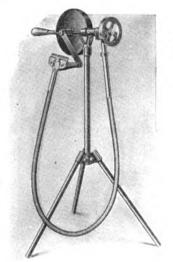
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The cut shows our coupling bolted to axle, and the form on flat leather bushing takes, when the shafts are placed and locked in the coupling. The leather can be securely fastened in by the user, by driving a soft wire nail through the small hole we drill, which clinches it.

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We would like to send you our circular and have you try our Couplings. They will save you money.



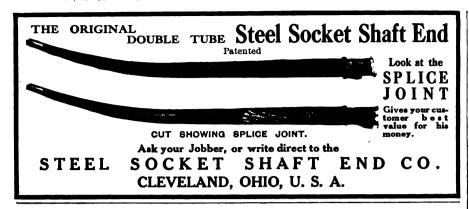
Patented Nov. 25, 1902.

The Spring is pivoted at the front so that it can be turned forward out of the way of the wrench while clipping the Coupling to the axle.

These are two of the good points, but there are plenty more desirable features in our Couplings.

We also have a Catalog showing our full line of Carriage and Wagon Forgings all of which we make

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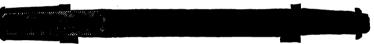
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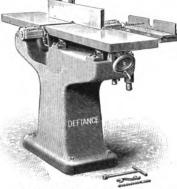
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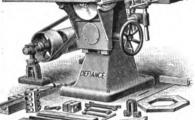
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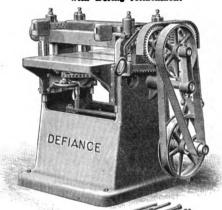


12-Inch Hand Feed Planer

No. 8 Variety Saw-Rip and Cut-Off



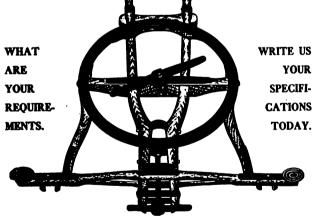
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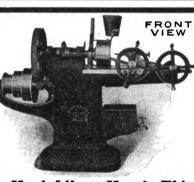
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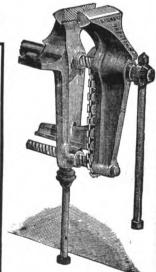


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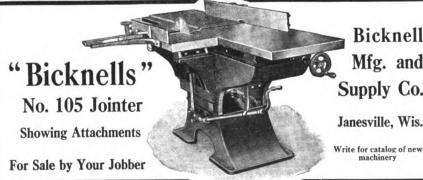


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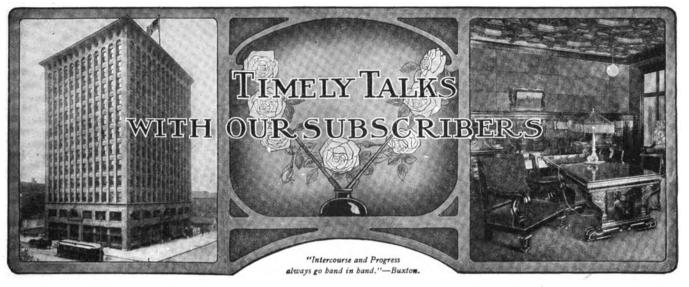
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To the Point.

We could write from now until doomsday about what we think of "Our Journal," yet if you did not think it a good one, the best that could be produced, our writings would be for nothing. More to the point is your thought about the paper. And, right here, let us read you a right-to-thepoint thought that comes to us from a Michigan subscriber. He says: "I have had sample copies of other blacksmith journals, but The American Blacksmith beats them all and is the one I am going to stick to." This opinion is more to the point. We might tell our own opinion of the paper, but it is your opinion that is the more important. If you think the paper is very good—as good as it can be made, then tell your neighbor and get his subscription. If you think the paper could be made better, if you have some suggestions to make, if you think you can help us, let us have your ideas, your criticisms, your suggestions. We are always anxious to please our readers, that's what we're here for, and we want your co-operation.

Our 1909 Calendar.

Our calendar for 1909 is by far the finest art calendar we have ever published. The picture is full of interest and is one that will appeal with especial strength to "Our Folks." You'll surely want one of these beautiful calendars. If your subscription is not paid up to January, 1909, send in your renewal now and get in line for a copy of the finest calendar of the season free. If you don't know how you stand on our books drop us a postal. We will also have a few extra calendars for those of "Our Folks" who desire to advertise their own shops. But the demand promises to exceed the supply, so you'd better order now. It's none too early. A good calendar is the best advertising medium for the up-to-date smith shop. THE AMERICAN BLACKSMITH calendar for 1909 is the best calendar of the season.

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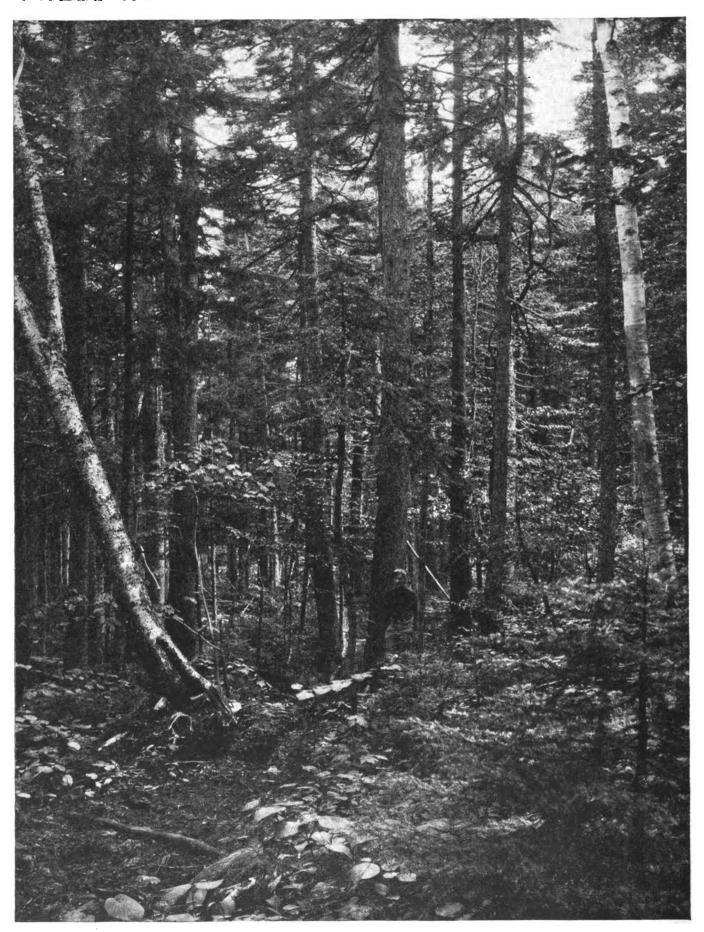
Our Book Department.

This department is always ready to assist readers in selecting and securing such books as they desire. To give you just an idea of what our book department has to offer this season the following standard works are mentioned:

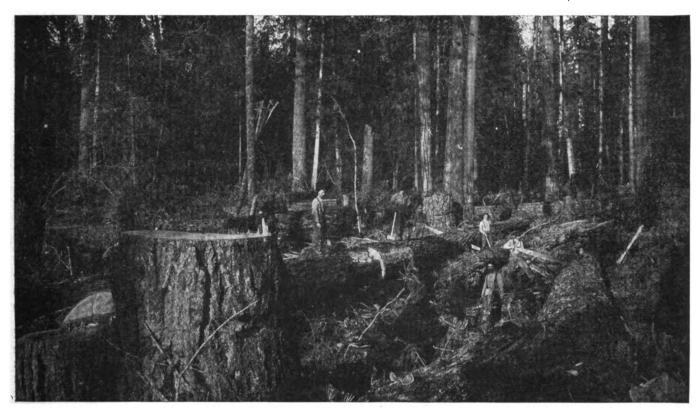
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IN THE HEART OF THE VIRGIN FOREST NATURE IS SEEN IN ONE OF HER MOST ATTRACTIVE ASPECTS



THE AXE AND THE SAW DEMOLISH IN A DAY THE GROWTH OF YEARS

Modern Methods of Lumbering Large Trees

vast importance of this great industry.

OW many people realize that the lumber industry is the largest single manufacturing business in the United States today in point of value of its product? Until one stops to consider the manifold uses to which wood is put on every hand, it is hard to realize the

The uses for lumber have been growing constantly, and today the forests of the United States are being denuded at an alarmingly rapid rate. For instance, to furnish new railroad ties and replace old ones whole forests are going down before the axe, while a single day's edition of one big New York daily newspaper requires the wood of fortyfive acres to make the paper. In this rapid denudation of our forests the vehicle-builder is necessarily concerned, and, while the story of how a giant of the forest is gotten to the mill is interesting to the layman, the story holds something more than interest for the user of wood in any quantity.

To take care of the constantly increasing demand for wood, the methods emploved in lumbering have

been greatly improved, and nowhere has this development been more evident than in the northwestern part of the United States, where exist immense tracts of rough, hilly land, heavily wooded with gigantic trees, some of them the largest to be found in the world, such as the famous California redwoods.

The question resolves itself into how to get trees to the mill at the least expense, and the methods employed



A HOME IN A GIANT STUMP

vary with the conditions, such as the size of the trees, character of the ground, and the climate.

In sections where the trees are small and the ground level, and where there

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Copyright, 1906, by Darius Kinsey

CUTTING A LARGE CEDAR THROUGH THE

LOWER PART



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A LOG ROAD THROUGH VERY HIGH FIRS



A LARGE "STICK" POINTED MILLWARDS



PRELIMINARY CLEARINGS ARE OFTEN NECESSARY

is no snow, the tree, after being cut down and having its limbs and top removed, is swung between two large axle wheels and partly hauled and partly dragged thus through the woods, either to the railroad, or to the sawmill. In swampy lands logs are often hauled out to railroads by means of wire cables and steam power. Where the swamps are intersected by waterways, scows are employed to pull the logs out of the swamp, when they are transported by boat or rafted to the mills.

Portable sawmills are frequently employed, the mill being transported from one section to another as the forest is cut. This is an economical way, especially where the finished lumber is to be used in territories adjacent to the mill.

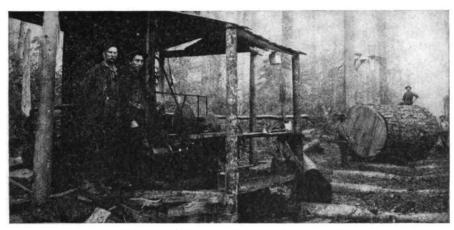
In colder climates where snow and cold weather can be depended upon in winter, the trees are cut with axe and saw throughout the fall, converted into logs and, by means of horses or oxen, dragged out of the woods to the logging roads. These, when the colder weather comes, are packed with snow and frozen so that huge sled loads of logs are hauled with comparatively little effort to the banks of a stream. Here they remain

until the spring thaw and floods, when the logs are rolled into the water and transported on the swelling stream to the mill.

More lumber is today annually cut in the two northwestern states of the United States-Washington and Oregon —than in any other similar area in the world. The conditions found there are entirely different from those met elsewhere and have required special solution of the problems involved. The cedar, fir, and redwood grow to immense size, the trees averaging some one thousand to fifteen hundred feet of lumber, one spruce log alone being on record as having yielded fifteen thousand feet. A height of three hundred feet, with a base of ten to fifteen feet in diameter, is common, some running to four hundred and fifty feet high and twenty-five feet in diameter. When the lumbermen first went into this region they cut out the trees adjacent to the streams and were thus able to transport them to the mills with comparative ease. As this supply became exhausted it was found necessary to go further and further back into the hilly country. The problem of getting these huge logs to the mill from almost inaccessible regions has been



STEEL WEDGES ARE USED TO KEEP THE SAW FROM BINDING Digitized by



A DONKEY ENGINE HAULS THE LOGS OUT OF THE FOREST

ingeniously solved in different ways, depending on the conditions.

Lumbering in these districts is carried out by an organized crew of from thirty to forty men, each with their carefully appointed tasks and their discipline so rigid that such a gang will often cut forty-five thousand board-measure feet of logs each day throughout the year.

Having selected the tree, an undercut is made on the side toward which the tree is desired to fall. This is done by two men with axes, and in order to avoid greater thickness of the tree at the base, as well as the inferior character of the lumber, these axemen are often obliged to work on spring boards, let into the tree several feet above the ground. Two other men working a long, thin saw, cut in from the side opposite the undercut until the two very nearly meet. By means of steel wedges driven into the saw cut, the tree is forced over very accurately in the direction desired. Great care is necessary, as the tree may be totally ruined by not falling in the exact spot chosen. Other men of the gang then saw the trunk into logs of convenient length, twenty, twenty-five, or thirty feet, sometimes cleaning the bark off entirely as a preliminary step.

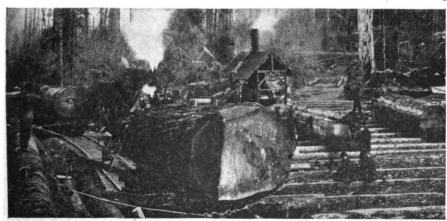
Having the trees thus felled and divided, their transportation millwards begins. In order to facilitate their progress over the rough ground, skid roads are formed through the forest consisting of logs laid five or six feet apart. For transporting over these skid roads small logs are hitched end to end, or big logs taken singly and by means of large teams of horses or oxen are dragged to the logging railroad landing, or else to within reaching distance of the wire cable of the donkey engine. This latter device, which consists essentially of a portable steam engine and boiler of twenty-five to fifty horsepower, with winding drums and steel cable, has been one of the biggest factors in the development of the logging industry in this region. This donkey engine is often located adjacent to the railroad, and its steel cable stretches into the woods, sometimes for a mile, or a mile and a half. The logs are hitched onto the end of the cable, and the engine, by winding up the same, draws them from the woods or over a skid road to the railroad, where the engine is also employed for loading the logs on the cars. Frequently such donkey engines are located in the heart of the forest at the far end of the skid road, and by stretching



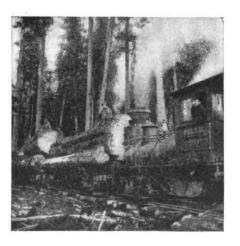
A LOCOMOTIVE SOMETIMES PUSHES ONE LOAD WHILE HAULING ANOTHER



READY FOR THE TRIP OVER THE SKID ROAD



Copyright, 1899, by D. R. Kinse THE ENGINE ALSO LOADS THE "STICKS" FROM THE SKID ROAD TO THE CARS



ENGINE AND PART OF A LOG TRAIN

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THE DONKEY ENGINE HAS BEEN ONE OF THE BIGGEST FACTORS IN THE DEVELOPMENT OF THE LOGGING INDUSTRY IN THE NORTHWEST

the cable in different directions, all of the territory for a radius of a mile around can be covered. After the logs in this region have been "yarded," as it is called, or dragged to the beginning of the skid road for transporting to the railroad, the donkey engine cable is hitched to a distant stump and, by winding in on the drums, transports itself to a fresh locality and begins operations anew. The most powerful of these engines are capable of dragging a load of thirty thousand feet of lumber (board

measure), weighing one hundred and twenty thousand pounds.

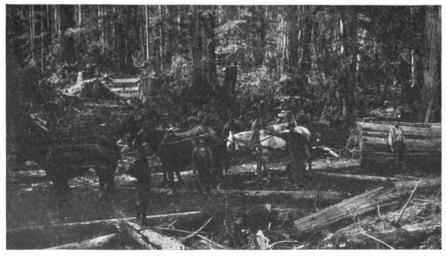
Logging railroads of broad and narrow gauge are common throughout this region, commonly running from some stream back into the forest. They are mostly short, but transport huge quantities of lumber annually. In some cases the engine drags a long string of logs along between the tracks.

In some places where the grades are very steep log chutes are used, the logs sliding down a trough-shaped roadway (formed of logs, laid end to end) and usually ending at a stream or lake. In other places, where water can be had, V-shaped flumes are constructed down which the water current carries the logs or lumber.

The final stage of the journey of the tree on its way to the mill is usually by water, as the sawmills are located directly on a river bank, or on piles out over the river. The logs, brought down by the logging railroad by teams, chutes, or flumes to the river, are usually constructed into huge rafts chained together and floated or towed to the mill. In some instances immense log rafts are constructed by building a cradle, into which the logs are placed one by one, the whole sinking deeper and deeper as more are added, and being bound together securely by immense chains for towing to the mill.

To handle the immense logs, which must be sawn, specially large apparatus has been required, band saws with unusually large carriages being chiefly employed.

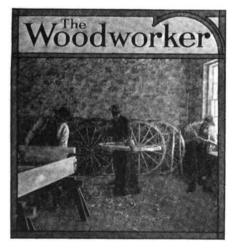
Almost all the large cities on the northern Pacific coast of the United States owe their prosperity to the development of the lumber industry, which has made possible the economical



SOMETIMES TEAMS OF HORSES ARE USED TO DRAG THE LOGS OUT OF THE FOREST

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cutting, transporting and working up of the immense forests of the Pacific coast. Many calculations have been made showing that at a comparatively early date even these immense tracts of lands will be exhausted of their timber, as is already the case in many extensive regions in the United States today, unless methods are adopted to protect the forests and provide for future growth of timber. Many tropical and subtropical woods are even now, and have been for some time, of sufficient value to warrant their exportation, so that with economical methods of handling, there should be an increasing market for the splendid timber growths to be found in Mexico, Central and South America, and the West Indies, especially in view of the steadily advancing prices on lumber in the United States.



To make a glued joint waterproof rub the ends to be joined with chalk, and then glue in the regular manner. G.A.N., Illinois.

A good putty for the vehicle builder can be easily and quickly made of dry white lead mixed with equal parts of japan and rubbing varnish. O. A. C. Pennsylvania.

To remove tire bolts that have become rusted drill the bolt head out as far as the countersink in the tire and then knock the bolt out with a long, thin punch. This prevents marring the felloe and saves considerable time. A. E. B., New York.

A sandpaper holder, for use when using the paper, will be found to be a great saver of this useful material. We made a block of such size to hold a third of a nine by eleven sheet, the usual size of sandpaper. The holder also enables one to do a good job besides using up every bit of the sheet.

F. A. PORTER, Massachusetts.

When repairing a reach, fifth wheel, or any other part of the under section of a vehicle requiring the removal of bolts, nut and other parts, try tipping the vehicle to one side. It saves lots of backache and enables you to do the work in less time. A block and tackle attached to the ceiling of the shop will enable you to raise one side of the vehicle very easily. Davis, Ohio.

Filling Sarven Wheels.

J. C. LAWRENCE.

True, there have been articles and talks galore on the subject of Sarven wheels and their repair. Some repairmen believe in notching the spoke and driving it past the rivet. Others believe in taking out all the rivets, putting in the spokes, and then in drawing the flanges down with new rivets. My method is neither the one nor the other. I do not believe a good wheel can be made by notching the spokes and driving them past the rivets. Neither do I believe it possible to draw the flanges down as they should be if all the rivets are removed and the flanges allowed to spring away from the spokes, as the flange will naturally do.

I can almost hear the reader ask "How do you repair them if you neither remove all the rivets nor drive your spokes past the rivets?"

I compromise between the two methods: I remove every other rivet, thus leaving four to hold the flanges. I then remove the eight spokes adjacent to the rivets, replace with new spokes dipped



THE FLUME QUICKLY CARRIES THE LOGS
TO THEIR DESTINATION

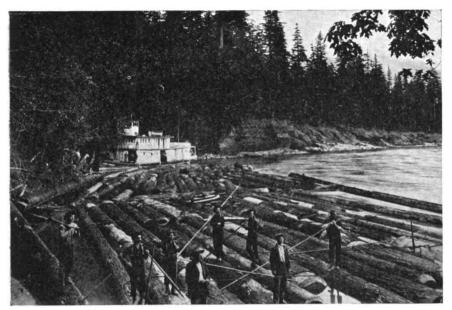
in hot glue, and then replace the four rivets. I draw the rivets down solidly, gradually drawing the flange tight. New rivets that fit the hole snugly are the only ones fit to use. Half the wheel is now filled.

Now I remove the other four rivets and repeat the foregoing. I dip the end of each spoke in the best glue just before driving and have the glue hot all the time. The result is a Sarven hub that is every bit as good as when taken from the factory.

A good deal depends, I think, upon how a man goes at the job of repairing a wheel. The first step of removing the first four rivets should be carefully done. Then the old spokes should be removed carefully and every particle of the old spoke must come out. The riveting, or heading, of the new rivets should not be



UNLOADING A TRAINLOAD OF LOGS. HERE BEGINS THE TRIP BY WATER



ONE FORM OF RAFT IN WHICH THE LOGS ARE HELD TOGETHER

done as though one were a bridgebuilder. The rivets should be carefully but firmly drawn. If the head of the rivet rests on the anvil, you can make a very neat job of riveting the other end. The glue must, of course, be allowed to set firmly before the wheel is put into use.

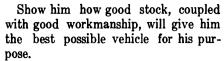
How to Set Buggy Boxes. P. L. FIELD.

The following method of setting buggy boxes has been found by me to be correct. Don't bore a hole in your hub of the same size throughout. Measure both ends of your box and then bore holes in each end of the hub to correspond to the size of the ends of the box. In other words, bore a hole the size of the large end of the box for about two thirds of the length of the hub. Then bore a hole from the other end of the hub to fit the point, or narrow end, of the box. The box is now driven into the hub good and tight and, having bearings on the hub at the ends only, the box will not work loose. In the case of the box having a bearing in the center, it is liable to work loose from the strain, and will, when once started, very soon wobble. It is also much easier to get a perfect fit between the hub and the box by boring the hub in this way.

Building a Good Wagon. JUDSON ALLEN.

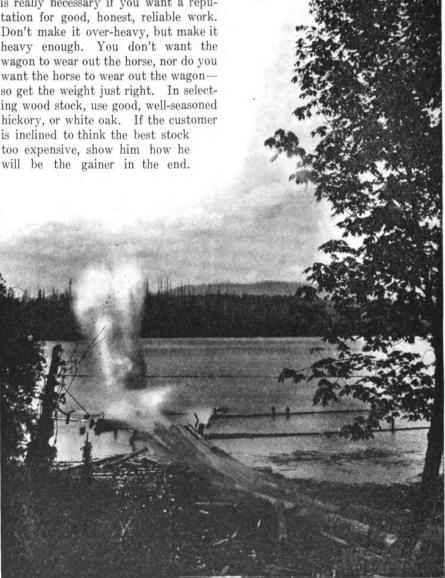
The building of a good wagon begins before a piece of wood or iron is cut. It begins with the planning. To build a good wagon one must consider what the wagon is to be used for, its work, and the roads it must travel. Knowing this, plans can be made accordingly.

Make the wagon a trifle stronger than is really necessary if you want a reputation for good, honest, reliable work. Don't make it over-heavy, but make it heavy enough. You don't want the wagon to wear out the horse, nor do you want the horse to wear out the wagonso get the weight just right. In selecting wood stock, use good, well-seasoned hickory, or white oak. If the customer is inclined to think the best stock too expensive, show him how he



Make all parts of the wagon equally good. Don't attempt to make up for defects in one part by making other parts exceptionally good. Poor work will show up in use, no matter how much good work is done to cover it up.

And right here let me speak of a detail that receives little attention at the hands of the average vehicle-builder. This is the bolting together of the work. See that all bolts fit their respective holes perfectly. When the hole is a bit too small, don't press a white-hot iron through it to make it the correct size. See that the hole is right in the first place. Burning it out chars and weakens



THE END OF THE LOG CHUTE DELIVERS THE "STICKS" IN CLOSE PROXIMITY TO THE RAFT CRADLE



THE FINISHED RAFT READY FOR FLOATING TO THE MILL

the wood and is by no means a very workmanlike method of doing work.

Strict attention should be paid to proportions and dimensions. See that all parts of the wagon are suited to the wagon in question. Wheels and axles, for instance, which will do for one wagon, may be entirely unsuitable for a wagon of like character but for use on different roads. In the same way, other parts may differ enough for your attention.

A good plan upon which to build good wagons and a good reputation at the same time is to pay careful and strict attention to all the details of the job. The finished product will then take care of itself. Good, sensible designing, good, well-seasoned stock, and careful fitting will insure a good wagon. A reputation for building good, honest wagons is more to be desired than great riches or the crown of a king.

Plans for Building A Bottler's Wagon.

NELS PETERSEN.

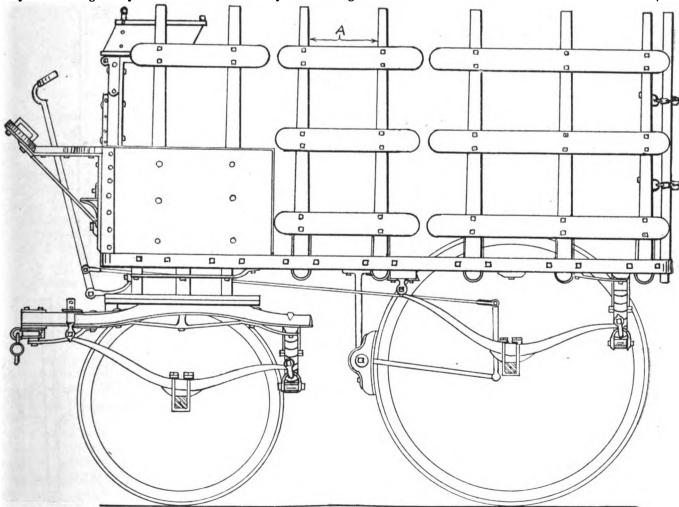
The working draft for this month is that of a brewer's or bottler's wagon. The engravings show a stake wagon, built especially for use by brewers and wholesale dealers for delivering bottled goods in cases. This would, of course, be of little use in a small country town where the drive well or town pump serves for quenching the thirst of the populace. But in large cities, where a big trade in this line of goods is carried on, quite a number of these wagons may be seen doing duty. These wagons are usually built to order, owing to the difficulty of obtaining one of the exact

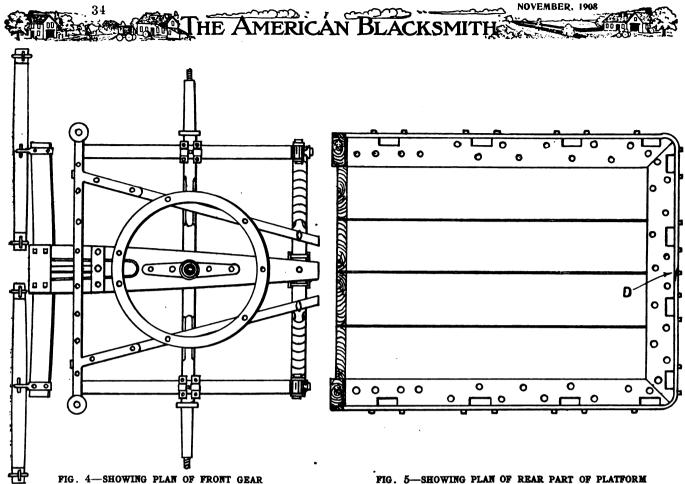


PLACING THE LOGS IN THE CRADLE TO FORM A RAFT

dimensions to suit the purpose of the particular business. A working draft showing the construction of such a wagon will, therefore, be found very convenient.

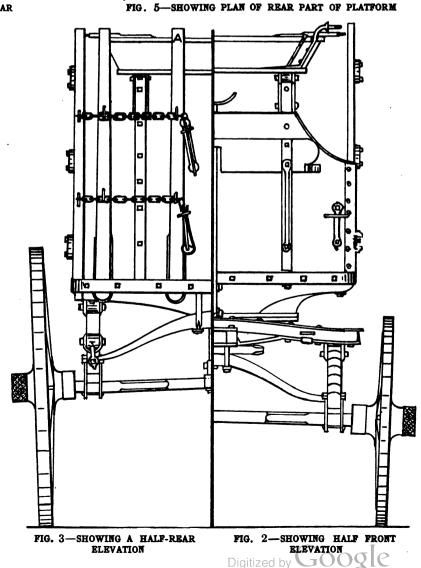
While all wagons of this type are not made the same size, the general construction is pretty much alike, and the size can be regulated to suit the customer's demands. In this case, the





body is made 8 feet 6 inches long by 4 feet 2 inches wide, outside measurements of the woodwork. The side sills are made of 2 by 5-inch stuff and are joined to the front and back sills at the corners by being halved. The holes which form the stake pockets are cut into the sills as shown in Fig. 5. This is a top view of the rear portion of the body. An iron band made of 2-inch by 1-inch bar iron is fitted the entire length and width around the body, the ends being drawn to taper where they meet and overlap each other at the center of the front and back sills, as shown at D, Fig. 5. This band is held securely to the sills with half-inch bolts, which are driven through the sills from the inside. To further strengthen the sills and prevent them from wearing, a band of iron 5 inches wide is bolted on top of the sills, \frac{2}{3}-inch tire bolts being used for this in order to have a smooth surface for sliding the cases and other merchandise over.

The stakes, of which there are seven for each side and four on the back end, are made of $2\frac{1}{2}$ by $1\frac{1}{2}$ -inch stock and are 45 inches high. They should be spaced so as to be equidistant from each other. The two on each side marked A in Fig. 1 and the two middle ones at the rear end marked A, see Fig. 3, are made so as to be easily removed for loading and unloading. The seat risers are made of $1\frac{3}{2}$ by $1\frac{3}{2}$ by 34 inches high, the seat



being fastened to the risers with hinges which are supported by a heavy corner iron running full length from the seat to the sill, a bolt end being welded to the lower end of the corner iron and passing through the sill. The seat is also provided with a top, constructed on the same principles as an ordinary buggy top, it being deemed unnecessary to run the top the full length of the body. A side view of this top is shown in Fig. 6. The top measures 3 feet 81 inches high from the bottom of the seat, and 3 feet 7 inches long. All the covering for this top, including side curtains, back curtains, and back stays are made of heavy canvas, instead of leather. The running gear is of the full platform style with side springs 21 by 40 inches long with nine leaves, and the cross springs 21 by 42 inches

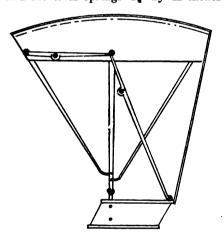
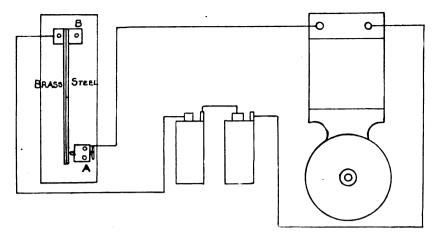


FIG. 6-SHOWING SIDE VIEW OF TOP

long, with ten leaves. The axles are 12 inches, with a 9-inch spindle. The wheels are 36 inches and 48 inches high, with a 12-inch thread in front, and a 12-inch thread for the hind wheels. A good idea of the construction of the front truck may be had from a study of Fig. 4, which shows a top view.

An Automatic Fire Alarm. D. FOSTER HALL.

Here is something which the boy can make, or which may appeal to the man, too. This alarm is simple and automatic and needs no attention after once installed. It consists of a thermostat, electric bell, and two dry cells. The thermostat is made of a piece of steel and a piece of brass, riveted together and fastened to a wood back, which is 6 inches long, 2½ inches wide, and $\frac{2}{8}$ of an inch thick. The brass and steel pieces are $\frac{42}{4}$ inches long, $\frac{2}{8}$ of an inch thick. These pieces are fastened to the wood back with two brass angle pieces, as at



AN AUTOMATIC FIRE ALARM EASILY MADE

B in the engraving. The angle piece marked A has a small screw for adjustment. Brass expands and contracts more than steel, therefore, as the temperature rises the brass expands and the straight line is changed to a curve, thus bringing the free end of the steel piece in contact with the screw at A, which completes the circuit and rings the electric bell, which is located in the sleeping room. The battery may be in the cellar, and thermostat in any room where wanted, or, if desired, several thermostats may be located in different rooms.



Benton was looking over the November proof sheets. "This number looks as if it would interest your readers very much," said he. "That article on lumbering will certainly attract the attention of your wood-working readers."

"That article should certainly prove interesting, especially in view of the attention being paid at this time to the preservation of our forests," returned the Editor.

"Altogether, this is a very interesting paper," said Benton. "But where is your ornamental-iron number? I thought that was scheduled to appear for November." "It was planned for November, but by one of those inexplainable accidents that cannot be foreseen it was necessary to rearrange our schedule." Then, continuing, the Editor said. "Practically all the material for the ornamental-iron number has been ready for months, but it was necessary to change our issues about and December will now be the ornamental-iron issue. And I think you will say with me that it surpasses our previous ornamental-iron number by a great big margin. When you consider that the first ornamental number was a good one, that is saying a good deal."

"You make one anxious to see this next issue," said Benton. "Ornamental work has made some great strides in the past few years and your December number should certainly be interesting and valuable to smiths generally."

Jack Mason put in his appearance at this point and wanted to know how to anneal some copper so he could work it easily.

"Treat it the same as you would steel if you were hardening it," replied Benton. "Heat the copper to a red and then plunge it into cold water, cooling it suddenly."

"Will that make it soft so I can work it easily?" asked Mason.
"That will make it about as soft as

"That will make it about as soft as lead. If you work it very much anneal the copper frequently, as you know that hammering copper causes it to become hard, but if it is annealed occasionally you can work it easily and satisfactorily."

"Well, that's very simple," said Mason,
"Doesn't seem to be much to that."

"Yes, and you'll find brass will succumb to the same treatment," put in the Editor. "Brass and copper, both, become hard and springy when subjected to hammering and they both become soft when heated and then quickly cooled."

After Mason went out, the Editor handed Benton an advance proof of the calendar for 1909 and asked him for his opinion.

"Well, I just want to say, Mr. Editor, that I think this the handsomest and most natural calendar picture that I have ever seen. The pose of those children, the expressions on their faces, the interest shown by the horse and the smile of the shoer are just as natural as life. Seems to me—"

But the noon whistle interrupted further conversation on this topic, and the reader is referred to the calendar elsewhere.

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The Blacksmith of Bottledell.

JAMES MAURICE THOMPSON.

Horny hands and swarthy face, Burliest of a burly race. The Saxon blacksmith took his place

Beside his anvil. "Sir," said I,
"They say you've laid a fortune by;
Why still your hard vocation ply?"

"Stranger": said he, "I see your plan, A prying, interviewing man, Come to find out all you can,

"And put it in the papers. Well, You see I did quit work a spell, Till Tom Sparks came to Bottledell;

"Tom Sparks, the blacksmith over there, At t'other corner of the square, And folks said I wa'nt anywhere—

"That this Tom Sparks could beat me blind At blacksmith work of any kind, 'Specially putting on horses' shoes behind!'

The speaker paused and breathed a spell, And from his eyes the flash that fell Lit the bravest face in Bottledell.

'Stranger, I don't care what you say; I'm rather odd, I've got my way; I'll get on top, and there I'll stay—

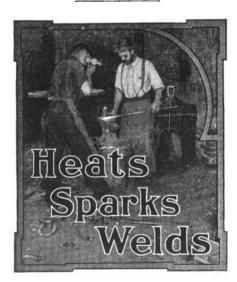
"That is, I don't care what the loss is, Learn my trade over, work under bosses, Or beat Tom Sparks a shoeing hosses!"

There is a lesson,—learn it well— Taught in the story that I tell Of that proud smith of Bottledell.

He had a soul, the type of those To whom success forever goes, For whom the victor's laurel grows.

Such wills as his have caught the world, And held it fast when thrones were hurled Together, and the red flames curled

About the wreck. When Cæsar fell No grander spirit said farewell Than had the smith of Bottledell!



You lose trade when you lose your temper.

A wise shoer's head saves a good horse's feet.

· Few men fail who really deserve to succeed.

When you give a man a tap with a wrench it's not necessary to hurt him.

"Nothing quite so good as iron''—How's that for an iron smith's slogan?

'Tis not the length of a man's life that is recorded, but the breadth of it.

Who waits for something to turn up is likely to turn up at the poor house.

A shop full of sunshine is very likely to fill the shop workers full of sunshine.

Fit the shoe exactly to the foot, but first put the foot in the best possible shape.

Remember, some horse-owners really do know what they want -treat them accordingly.

⁷Tis said that 150 million barrels are manufactured annually in Uncle Sam's domain.

Your gas engine if given the treatment it deserves will deserve the treatment it receives.

'Tis not the making of mistakes but the repeating of them that places us in the wise or foolish class.

'Twould seem, from the amount of drilling that some smiths do that they would make good soldiers.

Perhaps a self-playing organ attachment to the bellows or blower would solve the apprentice problem.

When you doubt your ability 'twere better not to try, for failure has already perched on your shoulders.

There's more to steel working than simply holding a piece of steel in the fire and plunging it into water.

Don't forget that you are your competitor's competitor when you conclude that competitors are pretty mean.

Real economy is not necessarily the saving of money. It is economy to be saving of what you get for the money you spend.

Two hundred and ninety-two acres will be occupied by Japan's great exposition in 1912. The Government will manage the fair.

Farmers will tuck away a big fat money roll this season—see that you get what belongs to you before they put it where you can't get it.

And you've read the paper from cover to cover! Go through again so as not to miss one line of its valuable matter. And don't forget the ads.

Some smiths are "backward in coming forward." Don't wait for the Editor to call personally before you give your ideas on your favorite topic—do it now.

Sense in business means cents in pocket, but scents in the shop mean lost trade. Common sense tells you to keep the shop clean. People with cents are glad to come to a clean shop.

"There's a big difference in what game you play with your help,' says Thornton. "Don't chase them as in 'Hare and Hounds,' but get them interested in 'Follow the Leader.' with yourself as the leader.'

A man may fill a mighty big book with what he thinks he knows about smithing, but a two-minute stroll through his shop will tell you more about his actual knowledge of the trade than all the books he could write in a lifetime.

It's not the location that gets the business, it's the man. Don't think the other fellow's stand is better than yours until you've made a great, big effort to do business at your own stand. And even then make another try.

In a single trip, the steamer D. R. Hanna brought to Buffalo four hundred thousand bushels of flaxseed, which was loaded in seven hours and was the product of forty thousand acres. It was worth \$460,000 and would make one million gallons of linseed oil.

Horse-feed tablets are the latest in Europe. This new food is a tabloid horsebread and is claimed to have many high qualities. It is said to contain a greater portion of nutriment in a lesser bulk and weight than the regular feed of oats, hay and straw.

Remember the water in the cylinder jacket these cold nights. Either drain it or use a non-freezing solution. A good one is made of four parts of water and one part of glycerine to which add about one pound of washing soda for every ten gallons of mixture.

"You must use this pretty hard." said Tom's visitor, holding up the stub of a broom. "Well, a smith shop is hard on brooms but then they rot out so quick that it's hardly any use to buy one at all." Friend Tardy evidently believes in letting a broom rot out rather than wear out.

"The Everything Fixer" is what Brother J E. Calland of Indiana calls himself. He does expert repairing of guns, bicycles, umbrellss, sewing machines, stoves, lawn mowers, baby carriages and the like, beside dealing in bicycles. He tells folks that "If Calland can't fix it, throw it away."

A new process for coating steel with copper has recently been invented by a Frenchman, named Monnot. This welding of the two metals gives all the strength of steel with the non-corroding qualities of copper. It is said to be practically impossible to sever the copper from the steel.

Some idea of the size of one of the big harvester companies can be had when we consider that it takes ore from its own mines, wood from its own forests, coal from its own coal fields, makes its own pig iron and steel and makes eighty-five per cent of the harvesting machinery and a good part of everything else the farmer uses.

A suggestion for those smiths located in farming districts: Every farmer's wife has need for a paring knife, a bread knife, a carving knife, and a cleaver—why not make up sets containing these articles? They can be made of scrap-pile stock, and will turn spare time into profit. Broken hacksaw blades make the best kind of paring knives while old spring leaves are just the thing for carving and other long blades.

"I've sold out' said Friend Tardy. "A real estate man from Cleveland called on me and said he had a buyer for my shop. Course he wanted something for finding a buyer, and I think five dollars is very reasonable for selling the shop at the price I asked. Tomorrow the man's going to bring in the buyer." We told Tom that he'd have a long wait. We also said that an agent who means real, honest business will not ask for any advance fee.

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Association Notes.

Arkansas State smiths and wheelwrights have adopted a price schedule. The craftsmen in Arkansas have joined hands under the name of The United Blacksmiths and Wheelwrights of Arkansas.

Utah County, Utah, has started the ball rolling under the able leadership of Mr. A. F. Ahlander. A membership of twenty smiths has already been secured and prospects are exceedingly bright for getting the entire county together very soon.

Nebraska State association will hold its second annual convention at Hastings, November 10 and 11. Every blacksmith. horseshoer, and wheelwright in the State, whether a member of the association or not, is invited to attend. Some important business of vital interest to every smith in the State will be transacted. An important announcement to the smiths of Nebraska will be found elsewhere on this page. It is earnestly hoped that every Nebraskan will answer this call in the proper spirit.

American Association of Blacksmiths and Horseshoers.

Blacksmiths, horseshoers, and wheel-wrights cannot do too much thinking these days upon the subject of organization. There are few mechanics who are more in need of organization and coöperation than those in the good old smithing trades. The need of coöperation, of unity, of brotherhood was never more apparent than right now. Smiths everywhere realize this need—the need of a spirit of coöperation to make conditions better in the trade.

And the way to secure this needed spirit of brotherhood is to organizeto get the smiths of your vicinity, your county, your state into one solid body. each working for the good of the many. Cooperation is the solution to the problems of the craft. Why do work for less pay than you deserve? Does the plumber, bricklayer, or any other tradesman have the difficulty you have in getting what his work is worth? Other trades are organized, why not the smithing trade? Why not a solid organized body of the smiths of your county? It means protection, harmony, better prices and a pull together. It means something more than a mere living for you and your family; it means a few comforts in life, instead of a continual striving for a mere existence, at work poorly paid. It means a better understanding of craft affairs with your brother smiths. It means better equipment, and, therefore, easier work for you.

Will you take advantage of this opportunity to better your condition? Will you grasp this opportunity to get better pay for your labor? It requires the mere spending a penny for a postcard, the writing of your name and

address, and by return mail I will send you my easy plans for the formation of branch associations. Address me, Box 974, Buffalo, N. Y., and start the association movement in your county. Get busy now, so that the busy season will find you prepared. An advance of ten cents on shoeing alone will mean much to you at the end of your busy time. It means more money without any additional outlay or labor. Will you send your postal today?

THE SECRETARY.

To the Blacksmiths, Horseshoers and Wheelwrights of Nebraska.

On July 23d, 1908, the Executive Board of the State Association held a meeting in Lincoln, the following officers being present: President J. W. McKay; Vice-President W. M. Rosborough; Secretary T. H. Chadwick; Treasurer C. W. Murphy; Executive Members James I. Depue, George E. Loder, J. W. Edwards.

The meeting was called to order at one o'clock P. M., and the requirements and conditions of the craft were thoroughly discussed. It was moved by J. W. Edwards "that an attorney be employed to draft two (2) bills for the betterment of the Blacksmith, Horseshoer and Wheelwright, as we are a business class without protection, said bill to be brought before the State Legislature. First: Making all labor performed by Blacksmiths, Horseshoers and Wheelwrights claim a prior lien upon all property where labor has been performed. Second: All Smiths who have not been in the business for a period not exceeding three years previous shall pass an examination before a State Board."

Honorable C. E. Strode was employed to draft bills and to introduce and follow bills through Legislature. Upon careful investigation it was found that it would require twelve hundred dollars to pass the law. A motion was made and seconded that every Blacksmith, Horseshoer and Wheelwright of Nebraska be assessed the small sum of fifty cents per month, commencing July 1st, 1908, to January 1st, 1909, for the purpose of defraying the expenses, as above stated. Every Blacksmith, Horseshoer and Wheelwright of Nebraska, whether he be a member of the Association or not. is requested to send in his assessment, either monthly or in one lump, to the secretary, where a record of names and money paid can be found. All remittances will be acknowledged by a receipt.

The matter of selecting a city for the next convention was discussed during the evening session. Hastings was chosen for the second annual convention to be held November 10th and 11th.

Yours respectfully, T. H. CHADWICK, Secretary Nebraska Association, Syracuse, Nebraska.

The Failures and Successes of an Apprentice.—6.

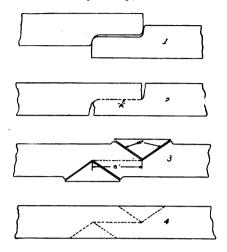
BY AN OLD-TIMER.

After my adventure in the lumber camp I rented a shop in a country town that was growing rapidly. There was considerable building and other business, but, some way, the people acted as though they were afraid of the blacksmith shop. They would "rubber" as they went by and I wondered what it all meant, but kept busy cleaning shop and getting the tools in shape. The first visitor to call was a very large man. He carried a large whip in his hand and a large cud of tobacco in his mouth. He walked around the shop a while, then he took a soldierly position in front of me, and in a most solemn and faraway voice said, "Young man, do you drink?" I said, "No, sir." "Well," said he, "that is one thing in your favor. The man who was here before you was good enough when he was sober, but he was never sober." Before night I guess every man, woman, and child in the town had heard that the new blacksmith did not drink. The writer does not say this to boast, but the very next day several of the leading people of the town called and congratulated him for being a temperance man.

Well, the work began to come in, but still some were shy. One day a man looked in at the door and said, "Do you pare horses' heels?" Now, of course, I wanted his horse to shoe and I thought to myself, "What shall I tell him; that I do or do not?" I made up my mind, however, that I would be honest with him even if I lost my job. Then I said, "It all depends on the condition of the horse's feet," I then hastened to add "We will try not to injure your horse if we do not benefit him." "Well." said he, "I want my horse shod, but I don't want his heels pared." I took one of the shoes off and called the man to look at the foot. "Now, you see," said I, "that one heel is higher than the other. To shoe the horse properly I must smooth the lower side of the heel and pare the higher side to match." "I see," said the man, "I think you know your business. Go ahead and shoe the horse as you think best." I forgot to say that this man once had a valuable horse lamed by having his heel pared too thin, hence his cautiousness.

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.It is not the writer's intention to give instructions on horseshoeing, much less to criticize what has been written on that subject. I have simply related a few instances as I remember them. I think I could have done well if I had continued in a job shop, but there was a



VARIOUS STEPS IN WELDING BY V-METHOD

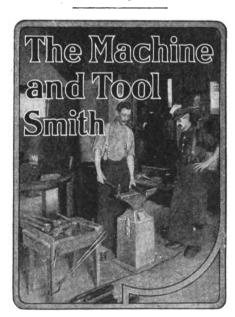
1, shows the bar ready for welding. 2, weld completed at "A." 3, vertical welding faces cut away and triangular filling blanks ready for welding. 4, shows the weld completed.

good deal of nice forging that I had to turn away because I did not feel competent to do it. It troubled me to see the work going to the city that I ought to have been able to do so I determined to learn how to forge. I sold out my shop, packed my trunk, and started for the big city shops.

I found only one forge shop where they wanted any help, and the foreman in this one said he had enough blacksmiths but was short of helpers. If I would take that place he would give me a fire at the first opportunity. So I went to work for the toolsmith. There were two fires on tool work but the second fire had only about half the time on tools, the other part forging. I was on the first fire. After working a while my boss was taken sick. I started the fire in the morning and was dressing a side tool when the foreman came around. He waited until the tool was done, then said, "I will send you a helper," and I was a blacksmith once more. When the smith was able to take his fire again the foreman kept shifting me around until I had a try at almost everything in the shop except the big hammer. The toolsmith on the second fire left the shop and I was given his place. I soon was able to forge and work steel with the average smith, yet I was troubled. It seemed to me that there was something about steel that I did not understand. but where could I get the information desired? This need was later intensified

when I became the first blacksmith for a machine shop. I wrote to a technical college asking if they could give me any information on the subject. They recommended a book on steel, which I sent for by the next mail. One night after supper my wife said, "Your book has come." I began to read the work on steel. At ten o'clock the family retired, but I kept reading; eleven, twelve o'clock came, and I was still reading. My better half got up and said, "It is midnight. Aren't you going to bed?" I said, "Yes, in a minute." but I read on. One and two o'clock came and my helpmate appeared the second time and said, "You must go to bed or vou'll not be able to work tomorrow." I said, "I am ready to go now." and as I retired I thought is it possible, after these years of anxiety and uncertainty, that I may master the art and know where I am and what I am doing all along the way. It seemed so, and with this thought in mind I dropped to sleep.

In conclusion let me ask the reader if it would not have been better for me, if it would not have been better for a thousand others, to have had this instruction at the beginning of their apprenticeship? Now, as the old-timer steps out, let the new-timer step in and bring something that will add to the advancement of the grand old craft.

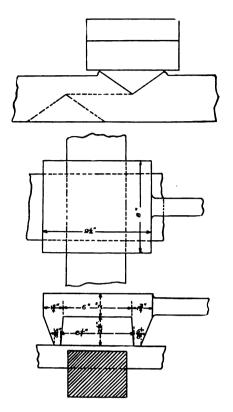


Making and Repairing Locomotive Frames.*

A. W. M'CASLIN.

Master Blacksmith P. L. E. R. R.

On the Pittsburg & Lake Erie Railroad we repair some of the engine frames, as many others do at this time, without removing them from the engine. We



SHOWING CHANNEL TOOL AND METHOD OF USING WHEN WELDING

have very good results in the heating. as far as the appearance of the completed job superficially would indicate. I do not say that we weld these frames. for I do not consider such an operation. made without a lap of some kind, deserving of the name "weld." In fact. this butting of frames is simply a burlesque on proper welding. I have satisfied myself as to the virtue of this socalled weld by making several in the shop, granting them many advantages that cannot be offered on an engine, and invariably they would separate with very little resistance from the light blow crosswise of the weld under a small steam hammer. The breaks would show that a union of the metal had been effected, but would also show a very feeble tenacity. Yet, knowing these facts, we are very much in favor of repairing frames this way wherever it is possible to spread the frame and take the heat, as it frequently keeps the engine in service until its time comes for general repairs, and this means quite a saving in money to our companies. We have what we think splendid burners, and build a very satisfactory furnace with standard-size fire brick.

I build the furnace with the bottom inclined as shown in the engraving, making it about one inch lower at its center than at the fuel holes at the ends. There is a small slag hole at the center near the bottom, so the slag will not

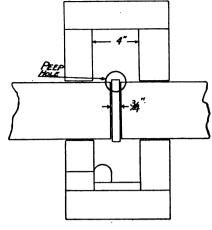
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^{*}Paper read before the sixteenth annual convention of the International Railroad Master Blacksmiths' Association, at Cincinnati.

gather and be blown up against the frame. We use two burners to this furnace, with crude and carbon oil as fuel, and take a very slow heat. The bottom, inclined as mentioned, helps to prevent the wasting of the bottom side of the frame and gives the heat a start to return over the top of the frame and out the peep hole. When the heat is complete, the furnace is pushed away into the pit and the work completed with light sledges.

I do not approve of making the side V weld under a heavy steam hammer without using a channel tool. When making this weld under a heavy steam hammer, the laid-in piece travels or flows both ways from its center, crosswise of the frame, without interference or resistance, and does not spread enough with its angle to increase the lap or weld properly against the walls of the V cut

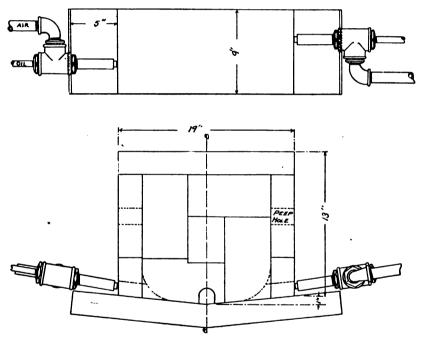
properly made, and the overhang not cut too close to the frame, then side heats drawn well up to the point of the V piece. This stock should be driven back into the weld and at the same time form a lap, where it is so much needed, that is, at the ends of this weld on the top and bottom of the frame Repeating: if the side V-weld is made in a frame under a heavy steam hammer there should be a heavy channel tool placed on top. This tool should be three inches wide, cut out two and a half inches deep and one half inch longer in the crown, and three fourths inch longer at the mouth than the cross section of the frame, that it may release readily. It will shear off the extra stock, prevent the laid-in piece from lengthening endwise, will drive it back into the weld, thus forcing it against the walls of the V, and lengthen the lap



SECTION THROUGH A-B, SHOWING ENDS OF FRAME IN POSITION

and a solid side opposite each V. This throws the laid-in pieces about six inches apart. This weld will elongate evenly when being reduced, and will not slip or shear, as the ordinary lap or V-weld will.

In my opinion the end V is the worst weld made, unless separate heats are taken and the parts put together with a heavy ram and a second heat taken on the laps. It takes time to prepare this weld. The parts are often placed together in the fire, but I never could quite understand why some prefer drawing a heat through a five-inch square bar than to heat to the center from one side, with the advantage of seeing the heat that enters into the center of the side V-weld, with the uncertainty of the end V-weld being welded at all in the center. Its liability to contain ditt and its generally successful disposition to separate at the point of the V. I avoid this weld when it cannot be rammed or forced together.



TOP VIEW AND AN END VIEW OF FRAME WELDING FURNACE

in the frame, that is, it cannot weld properly while flowing in a direction paralleling the walls of the V in the frame. This laid-in piece will travel alone, the bulk of the frame preventing the walls of the V cavity following. If we cut off the ends of this weld it will appear all right, the drag of the iron being just sufficient to hide the weld. The iron in the piece laid in will not be compact near its ends, neither will the weld near its ends be meshed to a sufficient depth.

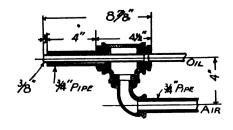
This will be entirely different as well as a satisfactory piece of work if done under a small steam hammer, with light blows, or with heavy sledges. In this case the laid-in piece should be

lengthwise of the frame. Then take a second heat on the laps; there will be no hole or opening at the points of this weld.

This is not only the most convenient weld to make in repairing frames, but it is the best. I certainly agree that the lap weld is the best weld made, but it is very seldom we can make this weld in new or repaired frames. Permit me to say at this time that we sometimes make in front sections of frames and in large hammer piston rods what we call a lap-and-V-weld; we flatten the end of each piece nearly one third, make the lap and weld as shown in engraving; then drive back the ends of the laps and lay in a V. This insures a solid center

Rock Drills.

A Canadian subscriber enquires about the making and tempering of rock drills. Now, it happens that about a month or so ago I was in to see my old friend J. W. Kerr, of Chicago, who makes a specialty of hand-forged tools of all kinds, and among other things I obtained a few photographs and some information that may be what our Canadian friend is looking for.



SHOWING SECTION OF BURNER Digitized by

Fig. 1 shows a number of these "drills," which are usually operated with a hammer. The first four are for rock work while number 5 is intended for use on brick work for enlarging holes and work of that kind. None of these tools need any explanation as to the making, as their form is plainly shown.

Fig. 2 shows a number of different sizes of drills of the same pattern as number 1, in Fig. 1. Fig. 3 shows the business end of these drills, which are Mr. Kerr's favorites. Fig. 4 gives two views of a brick chisel similar to number 5 in Fig. 1.

In hardening these tools nothing whatever is needed except good, clean water, or water with a little salt in it, and the hardening and tempering is best done at a single heat. The tool is heated to the hardening heat for about an inch or more according to the size of the tool, then dipped in water for about the same distance and the end quickly polished with a piece of emery cloth or something of the kind. As soon as the blue color runs

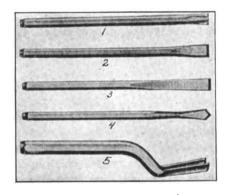


FIG. 1.—VARIOUS STYLES OF DRILLS

to the edge it should be plunged and cooled entirely.

Experience alone will teach a man the exact temper, as the hardness of the rock and the grade of steel will vary the conditions. If the drill "burrs" over in use, don't draw it so much. If it chips off too much draw it a little more. Remember that if, when the steel chips off, it shows a coarse grain like cast iron, too high a heat was used either in working the steel or in taking the hardening heat. In this case the tool should be worked

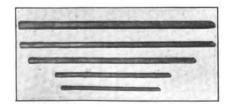
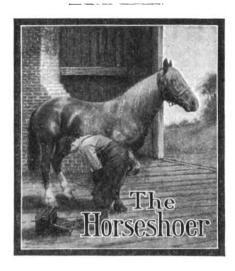


FIG. 2.—SEVERAL SIZES OF THE SAME STYLE

over or else cut off at the end. Any good grade of tool steel may be used, though the old reliable Jessop is generally used. High-speed steel in my opinion should not be used for anything that requires a blow to make it cut, as it is entirely unsuited for tools operated by percussion.



A Shoeing Talk by an Army Shoer.

T. H. BENNETT.

If the foot is put in proper shape the horse will go O. K. You must see how the legs stand and the shape of the foot, then get them level and on a line and he will travel right. I have shod horses that other men said could not be shod so they would stop interfering.

Now, about the man who shoes a horse and turns a long piece of the shoe out on one side to make people think he is a first-class shoer. Right there he shows that he does not know how to shoe a horse. Let him fasten a piece of iron on his own shoe, then start to walk. He will soon find out what he is doing to the horse. He is making him have lame joints. There are ten horses crippled from shoeing where one is crippled from work. Just look at the horses today and those fifty years ago and see the difference. In those days a blacksmith shod horses according to the shape of the foot. Nowadays, they shoe to their own fancies and do a horse more harm than good.

I shod horses for the United States for ten years and shod one lot of horses for two years, and when they would go on a long march and travel all day after Indians they would come into camp free and lively, while other companies' horses would be played out and lots of them would die on the plains. I received the distinction of having the best-shod horses in the United States army, from the inspecting veterinary from Washington.

I would always get the foot in proper shape and then fit my shoe to the foot so that it was level and fit the foot all around on outside. Then the horse could travel all day and not play out. I never burn a foot with a red-hot shoe, for it injures the hoof, and never turn a clip up on shoe or sides of shoe, for that is the same as placing the foot in a vise. You never saw a man do that fifty or sixty years ago, and there was not half the trouble there is nowadays.

When I first commenced learning the trade we had to make all of our shoes and nails by hand. If there were more shoers now that would shoe a horse's foot the right way, there would be less crippled horses. The foot wants to have a chance to grow out in proper shape, and so long as the foot is cramped up with clips turned up on toe and sides it cannot stay in proper shape. That will cause the joints to become stiff and sore. Common sense will teach a man this, for if the horse steps on a rock or



FIG. 3.—HOW THE ENDS ARE SHAPED

pebble, the soreness caused will reach the joints and make them stiff and sore; then the horse is lame.

To Remedy Clicking or Forging. P. P. GREENE.

No rule is infallible for this trouble. The fault may be in the build of the horse, as horses which are long-legged and short-bodied are predisposed to over-reaching. Many shoers try to stop this trouble by lowering the heels and raising the toe of the hind feet, which is good so far as it goes, but, in practice, the horse which "clicks" will be found to do so from many causes. A horse suffering from any pain in the front feet, legs or shoulders may have his action in front so impeded as to allow his hind feet to come in contact with the

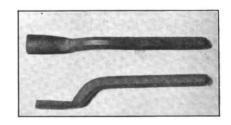


FIG. 4.—TWO VIEWS OF A BRICK CHISEL
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front ones. Examine the horse closely for corns, thrush, bruised heel or sole, sore tendons, or any cause for pain. Shoe to relieve pain and, if shoeing with



MR. A. F. LIBBRY, whose articles on shoeing have interested our readers for some time. Mr. Libbey has a most interesting collection of foot specimens and odd shoes.

a flat shoe, shorten the toe from the bottom as far as possible in front feet, and roll the toe of the shoe up, Fig. 1. If shoeing with heel calks and without a toe, Fig. 2, very little roll will be enough. If shoeing with toe and heel calks set toe well back on the inner web of shoe and leave the heels at least one quarter of an inch higher than the toes. See Fig. 3. Shoe the horse behind in any style, but have all three calks the same height, or use a flat shoe. Have shoe extend one quarter of an inch in front of the extreme end of toe (or where the toe should be) and at least an inch behind See Fig. 4.

Do not forget that slovenly driving will cause some horses to click, where, if driven with a tight rein, they would not do so. Some horses click going along slowly, some while at full speed, and others at a fair gait. The driver can work wonders if he will only try. When you examine a horse's old shoes look at the front shoes, and see where he strikes them. The nearer to the toe. the easier to overcome. If only on the outside branch, a side-weight shoe on the hind feet, with the strong weight on the outside branch of the shoe, will often cause him to carry his hind feet past the front ones. These remarks relate to horses which go at a trot only and are suggestions and not rules.

I have found two horses on which I could make no perceptible effect. Often the trouble is simple, viz., the horse has been in the hands of a careless and ignorant shoer and has been allowed to grow an excessive toe in front. When

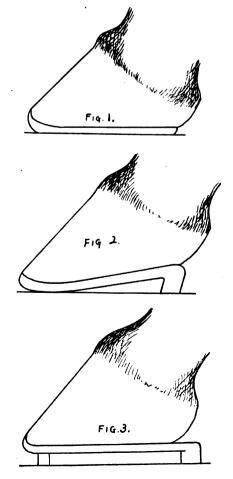
this caused him to over-reach, instead of cutting down the toe he would set the hind shoe back under the toe to deaden the noise, which remedy only caused the horse to over-reach worse and to wear his hoof off to the shoe again. Another dose of the same treatment:-his hind feet will be an inch or more too short and his front feet the same amount too long. A short front foot with a rolled toe or a toe calk well set back and a long, level hind one long enough to come to where the toe should have been would in this case almost certainly cure the trouble. A good remedy to help out sore front feet is to paint the hoof and sole with raw linseed oil and pine tar. Then, take an old rasp. heat it and hold it an inch or so away to warm up the mixture, so it will enter the hoof. This should be done after shoeing and only once a month. The oil should be only well warmed, not hot.

Thornton's Letters.—21.

Being "Straight-from-the-shoulder" Talk
from a Prosperous Self-made Smith
to his Former Apprentice,
now in Business.

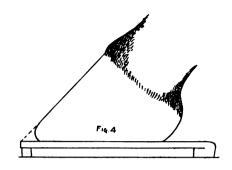
Dear Jim:

Fifteen or twenty years from now some men will explain the advertising



SUGGESTIONS FOR THE CURE OF CLICKING

successes of today by saying "Oh! those were better days." And that's just what you're saying now about my early success in advertising. I



THE SHOE EXTENDS BEYOND THE FOOT

don't care a fig how much money you've spent in advertising—if you spent all the money John D. ever saw, and you put Carnegie's with it, advertising pays. If it hasn't paid you, then your advertising is wrong or your work is wrong or something else is wrong. But you just paste this on your hammer handle—the fact that advertising pays is not wrong.

Take that handbill of yours, the biggest fault with it is that you tell how you don't do work. The fact that you don't use poor lumber in your wagon repairs is no indication to your prospective customer that you do use the best material. Why in the name of good advertising don't you tell how you do build wagons-how you do repairing, instead of making a great show of fireworks about the poor jobs some other smith turns out. Another thing about your advertising is the display of type. The majority of printers seem to have a mania for showing how many different styles of type they can get into one advertisement. By actual count you have six styles of type in your hand bill and goodness knows how many sizes of type. Simplicity is the rule today. Then again there is just as much to say about seasonable advertising for the smith shop as there is about a department store.

And talking about seasonable advertising reminds me of a little incident that occurred day before yesterday. Sandy, my brother, came into town to be measured for a suit of clothes. I went with him down to his tailor's, and while waiting for him I looked about the place. The first thing that struck my eye was a sign which read, "Ask to see our latest importations for summer wear." It was one of these pink and green tinsel signs, looked

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HAVE YOU AN AUTO?

- ¶ We carry supplies and do repairing. Blow your horn at the door some day, whether you need anything or not, and we'll show you how well equipped we are to take care of your machine.
- ¶ Possibly you've forgotten that we insist upon quality in material and workmanship? We do. We can please you. We've got lots of particular people as customers.
- ¶ Waterless Gasoline—Auto Oil— Dry Cells—Spark Plugs—Horns— Lamps—in fact, anything you want in the line of auto supplies. Let your next order be from

THORNTON'S

Auto Supplies at Right Prices
Third Street

as though it had been hung up during the war and had never been taken down. And that "summer wear" made it about as seasonable as snow would be on the fourth of July. Other things about the shop were on the same level.

When Sandy and I came away I asked why he went to that particular tailor. "Well" he replied, "he's a very good workman. His clothes are made right—there's no fake about them." "How does he find business?" I asked. "He complained that business is getting poorer every day." Replied Sandy "He said he couldn't understand it. Said he'd have to get out of the trade if it didn't pick up soon."

Well, I told Sandy to tell the tailor to clean up shop, to dust thoroughly, to repaper the whole place and to throw out every sign in the shop. And if that tailor does that and pays a little more attention to the general appearance of his business place he will find trade picking up.

Why do I tell you this? It's advertising and every bit of this can be applied to advertising by means of printer's ink.

Another thing about your advertising, appeal to the better side of the customer's nature. If you advertise to farmers, don't let your announcement remind them of their potato bins. Let your ad be clean and dignified. Neat and dignified doesn't necessarily mean expensive. Look over the several ads I am sending you and then

consider which style of advertising will succeed first—vours or mine.

Now, as to a suggestion for your advertising, Jim, I would say that a personal call is the best kind of advertising a smith can do. But a personal call alone won't do. I would suggest that you have some neat folders printed telling who you are, what you do and how you do it. When you make a business call leave one of your folders. Then make a list of the people you have called on and send a card, circular, or some piece of printed matter to them regularly. Let neatness be your motto in planning your printing, and if you don't say at the end of three months that advertising pays I'll buy you a new hat.

Yours for more business,

Thomaton

Gun and Novelty Repairing.—2.*
w. g. MUMMA.

Taking Apart and Cleaning Guns.

If the gun is a muzzle loader the first thing to do is to take the locks off by taking out the fastening pins. Then take the barrel from the stock by taking the breech pin screw out. Take out the pins or bolts by using punches of the proper size to correspond. Then lift the barrel from the stock. If it is desired to take out the breech pin, screw the barrel in the vice, putting a heavy piece of cloth or leather on the

*Copyrighted 1908 by W. G. Mumma.

THE SPECIALIST

- ¶ He's the man you call on when things baffle the Jackof-all-Trades. The specialist has studied, experimented, and learned—he knows.
- There are all kinds of specialists today—they tell us that this is the age of specialists.
- ¶ We are specialists in smithwork of all kinds. We specialize, too, in pleasing our customers.

Send your next job to

THORNTON'S

Specialists in Smith Work
Third Street

The Careful Teamster

- ¶ He's the man you see sponging the faces and heads of his team on a blistering hot day. He doesn't urge his horses beyond their strength. He's as careful of them as he is of his own back.
- ¶ And what is more picturesque than the careful teamster's team? Clean, sleek-looking animals, gentle as lambs, strong as oxen, and willingness themselves when work is to be done.
- ¶ But a good team badly shod is worse than no team at all. Have the next set of shoes put on at

THORNTON'S

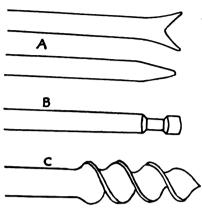
Shoeing that is Correct

Third Street

barrel to prevent it from being marred or bruised, then screw out the breech pin with a wrench. If the breech pin becomes stuck fast by rust or burnt powder, put on benzine or kerosene oil. and if it still sticks fast heat it with a gasoline torch or in a forge, when it can be turned out easily. The same method can be used in taking out the patent breech, also any screws that may become stuck fast. Sometimes it will be necessary to drill out screws, for it may be difficult to heat or there may be danger in melting the solder. In all cases be sure that there is no load in the barrel. Take no one's word for it, but ascertain it yourself, and be sure. The breech loader is taken apart by first taking off the barrel from the stock. The different kinds of breech loaders have different ways of fastening the barrel to the stock and one will have to act accordingly. After the barrel is taken off take off the locks, then the trigger guards and plates. After all the parts are taken off they must be thoroughly cleaned, wiped and then oiled. Benzine is the best article to use to clean guns; it will loosen the dirt quicker and better than anything else. About the best oil for guns is a good grade of sperm oil which will do as well as for light machinery.

The old way to clean out either a rifle or shotgun barrel was to wrap a piece of tow on the end of a ramrod or wiping stick, and, with a bucket of hot water, to swab out the barrel until clean. But it is a rather difficult matter to

dry out a barrel perfectly so that it will not rust. In fact, not a drop of water should ever be put in a barrel. A much better way is to stop up the tube or breech of a barrel and fill it up with



SEVERAL AIDS TO THE GUN REPAIRER

benzine. After letting it stand, unstop the breech and with a wiping stick with tow, candle wick or cotton yarn wrapped on the end, work back and forth. This will force the benzine and dirt out and clean it completely. Afterwards wipe out with clean tow or candlewick until perfectly dry, so no rust is liable to form. Sometimes if the barrel is very rusty, emery paper or emery powder placed on the end of the wiping stick, or pumice stone powder may be used to cut the rust loose. Then clean out as before. This applies to old muzzle loaders.

To clean out a breech loader that has become leaded and rusted or dirty, another method will have to be used. First, after taking the barrel off the stock pour some benzine on the barrel, let stand a short time and then use a scraper made as shown at A, by taking a piece of wire or steel rod about the size of the caliber, if a rifle (if a shotgun, about three eighths of an inch in diameter), and a little longer than the barrel. Flatten out one end so it will fit moderately tight in the bore, then hollow out the flattened end so it will make two sharp points. Form a ring at the other end for a handle. The points will cut the lead and dirt out quickly and effectually. It is too slow to attempt to cut with emery or pumice. The lead and rust have to be broken up and loosened. You need not be afraid that the points of the rod will scratch or tear up the barrel, for it will not injure it in the least. Of course, the rod should be softer than the barrel, a soft brass rod is perhaps best. Now make a wiping stick of the same kind of rod, as shown at B. Form a ring at one end and file out a notch at the other

end so that wrapping yarn or candle-wick can be wrapped around it so as to fit the bore tightly. Then put emery powder, quite fine, on the wrapping, and using plenty of oil, work back and forth until bright and clean. Finally push dry rags through the barrel so as to clean all the oil and dirt out. It will take but a short time to clean the dirtiest barrel in this way. This applies more to a rifle barrel, but shotgun barrels can be cleaned out in the same manner, except that the scraper need not be used unless the barrel is very dirty and rusty.

If the locks of the gun or other parts, either muzzle or breech loaders, are rusted or dirty, they should be taken apart and cleaned by using benzine and then scrape and rub all dirt from the parts. All of the screws should be treated the same way and each part oiled with gun oil and then wiped with chamois skin.

Good gun oil can be made by taking sperm oil of a good quality, or any animal oil, such as neats-foot, and clarifying by putting the oil in a bottle and putting fine lead shavings in it and letting it stand a short time. The impurities will collect on the lead and the clarified oil can be poured off. Let the bottle stand in the sun for two or three weeks, then filter through blotting paper and the oil is ready for use. One can buy several preparations already made called gun grease and various other names. It is very convenient to use and is put up in tubes.

There are some guns of peculiar make that are met with now and then that will have to be handled somewhat differently, and a careful study will show the mechanic as to how they are taken apart and put together. You will have to use care and judgment and know what you are doing.

(To be continued.)



Don't start the engine when the car is standing over a pool or puddle of gasoline. The muffler, when the engine is started, is liable to discharge a spark or two and if there is gasoline near by something is liable to happen.

T. M. W., New York.

The automobile repairer cannot be over cautious. A good rule to live up to, strictly to the letter, is to allow no naked lights

in the shop or at least in that part given over to automobiles. Caution in the use of gasoline and then caution in the use of naked light and the banishment of smokers, will usually insure safety in the auto repair shop.

B O. W., New York.

To repair a broken gasoline pipe get a piece of copper or brass tubing a size larger than the broken pipe. Clean all parts

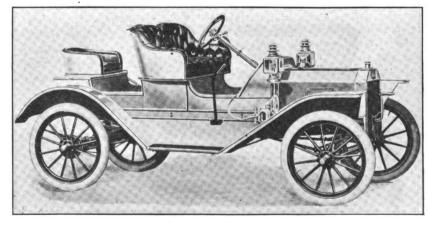


FIG. 1.—SHOWING THE FORD ROADSTER MODEL S

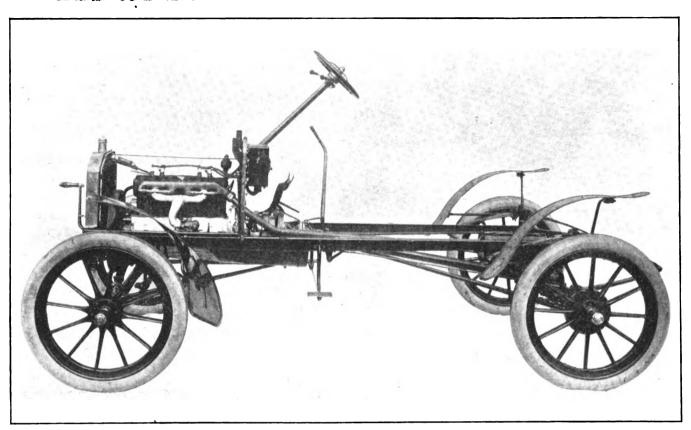


FIG. 2.—THE FORD ROADSTER CHASSIS VIEWED FROM THE LEFT SIDE

well and tin thoroughly the broken ends of the pipe and also the short piece of larger tubing. Now, force one of the broken ends into each end of the larger sized tube and heat the joints until the tin runs. This will make an excellent repair in a very short time. The short piece of tubing must, of course, fit over the regular piping reasonably tight to make a good repair.

G. T. W., New York.

Adjusting, Repairing and Caring for an Automobile.

With Special Reference to the Ford.

The engraving, Fig. 1, shows the model S Ford roadster. This is a four-cylinder fifteen-horsepower car with the cylinders cast in pairs. A side view

of the chassis of this car is shown in Fig. 2, while in Fig. 3 is shown a top view. In Fig. 4 is shown a near view of the motor showing the left side and the transmission. In this view of the motor can be seen the carburetor, the inlet pipe, the exhaust pipe and the water pipe just over the tops of the cylinders. The various other parts of this motor can be easily traced by those readers who have read the previous articles in this department.

Now, let us consider the various parts of the Ford car and how to go about their removal, replacement and other steps which the automobile

repairman is likely to be called upon to perform either in repairing or overhauling. Let us first consider the removal of the engine from the frame. This is accomplished as follows: Remove radiator; remove fly wheel; loosen upper rear spring clips so axle can slide back a few inches; remove two bolts front engine bracket to frame; disconnect oil tube to ball joint. Disconnect gasoline tube at carburetor; disconnect exhaust pipe and spark-plug wires; remove bolts transmission frame to pressed steel frame. Slide engine and transmission back until front end can be raised above frame; block up engine; remove bolts engine to transmission and lift engine out. It's unnecessary to remove dash or any other parts. It is, of course, seldom that the engine must be removed from a car but it is well to know how to go about it.

If it is necessary to remove the crank shaft for any reason a socket wrench and a gear puller will be found to facilitate this work very much. Remove cylinders, using special socket wrench. Remove side plates; disconnect connecting rods at crank shaft; remove steel half-time gear, using gear puller or similar device; remove front end plate; disconnect center bearing and draw shaft and center bearing forward. To replace, reverse operation.

To adjust the central crank shaft

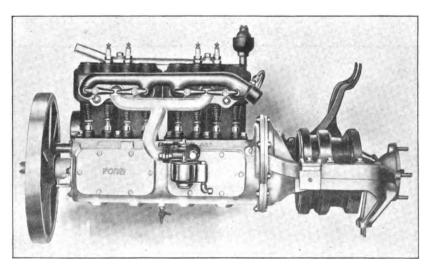


FIG. 4.—A NEAR VIEW OF THE FORD MOTOR USED IN THE MODEL S

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bearing—Remove aluminum side plates and with socket wrench remove the nuts from the bolts which project up through the aluminum base between the two pairs of cylinders. This will allow the lower half of the bearing to drop down; remove the fiber shims and file down until the bearing is a close fit for the shaft. As, owing to the downward thrust of the power strokes the wear is usually on the lower half of the bearing, this adjustment will be sufficient in most cases.

You should ascertain whether there is any looseness between upper bearing section and the shaft when the bolts are loosened. In this event insert a thin paper shim between the upper

force the plate away from its position if the center bearing is not true.

If a suitable press is available this is the best method of forcing out a bushing; otherwise it can be driven out. Every repair shop should have a bushing driver. This is simply and quickly made; take a piece of 1½-inch, round, steel or brass bar and turn one end down to slightly less than 1½-inch diameter for a distance of two inches. This leaves an ½-inch shoulder. Insert small end in the bushing and drive out.

The press is also handy for replacing end bushings, but if no press is available they can be driven in, using a wood block, to avoid marring the bushing. (Always use a wooden block when tight, carefully ream (using 1½-inch ordinary hand reamer) or scrape the bushing until the shaft will go, exercising extreme care not to leave the slightest play.

Care must be exercised not to strain or spring the crank shaft. Not only that, but, in handling, the utmost care should be exercised that it does not strike anything, and in laying it down be careful to lay it flat on the bench so it will not become warped.

Crank shafts that have been sprung are practically useless as it is next to impossible to straighten them to the degree of accuracy necessary. And right here let the repairer of automobiles be impressed with the necessity of

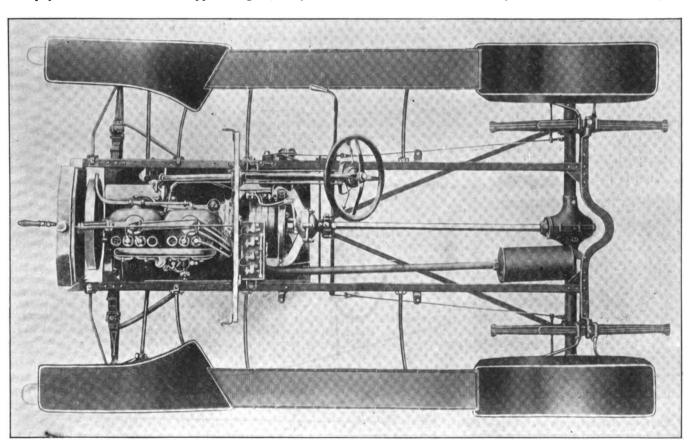


FIG. 3.—A TOP VIEW OF THE FORD CHASSIS USED FOR THE MODEL S ROADSTER

half of bearing and the aluminum crank-case.

Extreme care must be taken not to insert too thick a shim or to strain the shaft out of a perfectly straight line in adjusting the bearing. A deviation of even a few thousandths of an inch will produce a weave in the shaft when revolving, and this will soon set up crystallization with an ultimate result of a broken shaft. In order to ascertain whether your adjustment of the center bearing is straining the shaft remove the front end plate and slip it off the studs. The shaft will then

it becomes necessary to drive a metal part. It would seem unnecessary to give this advice, but experience teaches that many people do not observe even this simple precaution when working with machines).

In order to avoid any possible chance of the bushing turning in the end plate it is made a very tight fit. In forcing it to place it may be compressed so the crank shaft will not enter. If it will enter at all—without driving—it will not be too tight, provided you are careful to watch the lubrication for the first few days. If entirely too

extreme accuracy in automobile fittings of every kind.

If the crank shaft has been cut by letting the bearings run dry and hot, you can, provided they are not cut deeply, create a new bearing surface by carefully filing the bearings straight and round. A very fine file must be used, as the slightest scratch will serve to cut the babbitt, and it will soon run hot again. If possible, get a piece of crocus cloth (never use emery), attach a piece of heavy twine or belt lacing to each end of the crocus cloth, and carefully rub the bearing down with this.

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If the connecting rod bearing is found too large for the shaft in cases such as above, do not entirely remove the shim as it will be needed for future adjustment, but file sufficient off the thread end of the cap to make it fit the crank shaft. Connecting rod bearings should be tight fit and yet not have the slightest play—it should be sufficient to almost hold its own weight, just turning slowly on the shaft when released.

Should the connecting rod bearings need adjusting, remove the hand-hole plates at the left side of the engine base, when you can get at these bearings very easily. Bet ween the jaws of the bearing cap and the main section of the connecting rod will be found a fiber shim. This is removed and filed down until, when the cap is drawn down tight by the connecting bolt, the bearing fits close on the crank shaft.

(To be continued.)

Don't Miss This Opportunity.

Page 14 tells you how you can place your business card right before the men you want as customers—and keep it there. Don't lay this paper aside before reading the announcement on page 14. Turn to it NOW.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants to Build a Tire Heater.—I am going to build an oven to heat wagon tires in and I would like to ask brother blacksmiths through The American Blacksmith for advice on the matter. I have seen several heaters, but I still need more advice. Charles H. Matson, Michigan.

Wants to Handle Slip Shares.—I would like to ask some writer in The American Blacksmith for a good device for handling slip shares under a trip hammer when sharpening. What I mean is something to fasten the share to and to hold it. I have one, but I don't like it very well. I want a device to handle 12 and 16-inch shares. If some brother could help me

on this through The American Blacksmith I would be very much obliged to him. H. A. Henke, Illinois.

What would You Do?—I would like to have some good brother horseshoer tell me how to cure a foot where the sole has parted from the wall, from the second nails all around the toe. I am pretty sure the parting extends to the coronet. The horse in question is a little flat-footed and, of course, the parting makes the sole drop still more. Has all the wall got to be cut away where the parting exists to effect a cure? The parting at the bottom of the foot is one-half inch wide and the more the shoe is concaved the more the sole will drop.

Henry Nelson, New York.

A Handy Shop Device.—The accompanying engraving shows my handy man. Stretch a cable or stout wire across your shop and tighten it by means of bolts. Now take two awning pulleys and fasten them to rods, as shown in the engraving. Then fit the stock holder with a thumbscrew, so you can adjust it up and down, and you will have a good helper the next time your have an eight-foot binder sickle to weld.

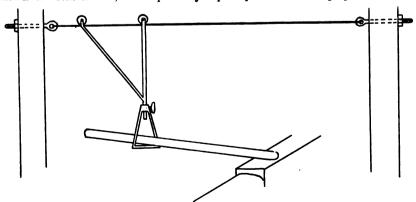
I have made most all of my tools that I have in my shop. I have a five-horsepower gasoline engine and a rip saw, a jig saw, an emery stand, a wood lathe, a disk sharpener, a grind stone, a drill press, and a blower, and, last but not least, my shop-made power hammer, which I have used for three years, and it is the biggest labor-saving tool that I have. George L. Coleman, Nebraska.

Gas Engines and Power Hammers.-Mr. H. E. Ruecker wants to know the best gasoline engine and trip hammer. I would refer him to the Fairbank's-Morse engine which is very simple and durable and a pleasure for the owner to run. is no bother and is always ready and for a trio hammer I find none better than the Hawkeye for general blacksmithing, they are so easily operated. I can crack a peanut on them and not smash the meat of the peanut. That is the beauty of them, you can strike as light a blow as you wish or as heavy. So why aren't they the best? They are simple and easily handled and also are durable. Don't think that I condemn all others. No, there probably

"Our Journal" for July that Mr. G. Koppins says "when a man comes in to examine a horse's shoes and if they are worn out on one side more than on the other, to cut the opposite side down." Now, I would like to say to the brother that he can't grow a foot aside from nature. He may trim it off on one side or the other but when it grows out it will be the same as in the beginning. I would suggest that the foot be trimmed according to the growth of the shell, then make the shoe heaviest on the side that wears out first, being careful not to make it higher, for when the foot is twisted the horse will go lame. The brother is all right on a law compelling an examination for horseshoers, for if anything in the world is abused it is the feet of the horse. I have been shoeing horses for ten years and find that the closer we horseshoers keep to nature the better it is for the Z. D. Robinson, West Virginia.

Power in the Shop.—I sincerely hope that the brother who wrote that article in the November issue and signed "Subscriber," has repented by this time and I won't be very hard on him. Power is something. I have advocated it ever since the gas engine came within the reach of the smith shop. I wanted the man for whom I worked seventeen years to put in an engine, and he hasn't got one yet. As soon as I had a chance to put one in my shop I did so, and I can handle three times as much work as without it. The man without power in his shop is as far behind the times as Columbus is behind Dewey. My sledges get rusty on the face for the power hammer has made them take a back seat. I do quite a lot of heavy work and only have an apprentice of two years to help me. In reference to my wheel work, the majority of my tires are 11 by 3 inches, and some 11 by 31, and I have no help besides my power, except just to work the welding heat. Without power I would often need two helpers to do work of that A. B. WILKINSON, Pennsylvania. size.

A Letter from Vermont.—Let that kicker step out. I have never been called upon to repair an auto yet, but enjoy reading in that line as well as all of the rest. If Mr. Kicker would read outside his line a little perhaps he would be prepared to do some



A HANDY SHOP DEVICE FOR THE MAN AT THE ANVIL

are hammers which will suit others better than the Hawkeye, but not for me. They are advertised in "Our Journal' about every month. Send for a catalogue and convince yourself. C. W. METCALF, Iowa.

On Trimming Horses' Feet.-I notice in

of the little jobs that he turns away.

I started here in an old shop, just after serving four years, and only had five dollars and a forge hammer. This was eight years ago. Since then I have built a new shop which is well lighted, have two

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fires, and plenty of hand tools. I forgot to state that when I started in there were five other shops in town with only 370 names on the town list. I have a nice little home with two acres of land. The first year I did only about \$315 worth of work. The next thing I knew I was reading "Our Paper" and practicing its teachings, until the last year I did \$1,550 worth of work with only an apprentice, and we could not keep up, so I have a journeyman this year. They flatter me by calling me the best shoer and all-around man near here. This I owe to the paper, and patience. H. G. Collins, Vermont.

Prices in Wisconsin.—The blacksmiths of Sheboygan County, with the exception of a few shortsighted fellows, are charging the following prices:

New shoes	.40
Resetting shoes	
Bar shoes \$.65 to	1.00
Neverslip shoes	.65
Steel-plugged shoes	.60
Setting tires	2.00
Setting axles	.75

What we need here is organization. Here is what I think of "Our Paper'':

nere is wnat I think of "Our Paper":

1.—I like your present methods of featuring the different branches in each issue.

2.—I like gas-power talk exceedingly well.

3.—Am much interested in machine shop talk; would like articles on this work.

4.—Benton's talks are all right, and I hope the old recipe book will never wear out. If it does, tell him to replace it with a new one.

5.—The Heats, Sparks, Welds are to "Our Paper" what salt and pepper are to a good dish.

6.—I like Thornton's letters, as they are good and spicy.

7.—I am also much interested in the Queries, Notes.

8.—I am not so much interested in ornamental work, but find it good practice.

9.—Would like the series on small repairing very much.

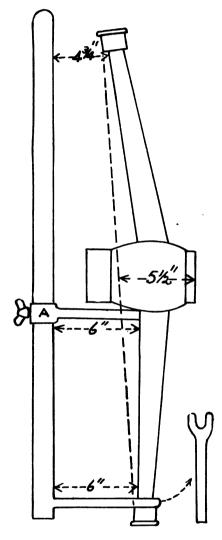
10.—And I say the same for the articles on marine smith work.

A. R. CAPELLE, Wisconsin.

A Letter From Tasmania.—I must say that I am very well pleased with the paper in every way. I notice that some of my fellow tradesmen do not like Benton's talks or Thornton's letters. I must say there is nothing like home truths to bring us up to the mark. It seems to me the shoe must pinch rather tight or else they would not complain about their remarks. I have noticed the remarks on the wheel problem. They nearly all illustrate a wheel going over a block or stone. The smaller the wheel the heavier the draft. I would like to ask a question on wheels: If the center of a pulley running on a shaft be in the boss, where is the center of a cart wheel running along the road? If no brother answers this problem I will try and answer it later.

In Tasmania the prices vary from 3s. to 5s. for light or heavy shoes, it makes no difference. One shop I was in in Melbourne, Australia, the prices were as follows:

A Gauge for Axle Lengths.—Brother Cronin wants to know how to get the length of axle for a plumb spoke. I have a gauge for particular work, as shown in the engraving. The bottom arm has a fork into which the spoke fits. The arm is exactly six inches long and the fork rests on the rim. A sliding arm, A. exactly six inches is adjusted according to the height of the wheel. I have just measured a set of wheels that I am working on and will illustrate from their measurement. Place a straight edge across the front of the wheel and measure to the back of the hub which in this case is five and one half inches; for two wheels it is eleven inches.



A GAUGE FOR AXLE LENGTHS

Taking this eleven inches from fifty-six inches, which is the track, leaves forty-five. Then I put on the gauge and measuring find four and three quarters inches from the top of the rim to the gauge or in other words, one and one fourth inches less than the lower arm. Add this one and one fourth inches to the forty-five and you have forty-six and a quarter which is the length between hubs for a fifty-six inch track. John A. Schulte, Connecticut.

A Talk on Tempering.—I have often seen directions in print for tempering steel in answer to inquiries, and must say that most of them are much to the point but to my mind, the most particular part of the process is generally (perhaps by oversight) left unmentioned. They generally

commence by telling you to heat the steel to a "cherry red." I don't know why they always stick to the cherry. I don't remember seeing a cherry for many a year, though my mouth waters at the mention of them. Faint recollection tells me that cherries were of many shades of red (and other colors too). Then, they say, dip the steel in water to harden, then draw to blue, or purple, or straw color as desired.

Now, I have no fault to find with the foregoing, but I say mention should be made of polishing the surface of steel requiring a colored temper. That is to be certain of the degree of hardness obtained, the steel (chisel for instance) upon withdrawal should be rubbed or ground to a bright surface, then you will know to a nicety how your temper is running. On the other hand, if you run the temper down with the fire and water scale upon the surface, you will have a poor idea of the correct temper obtained. Yes, the difference between a polished, and unpolished surface at the tempering point is as the difference between success and failure. Should like to hear what other brothers have to say to the above, and hope some brother may profit by the hint. George Robinson, New Zealand.

A General Shop of Illinois.—I am well pleased with the paper. I am a wagonmaker and am working now with four men, two in the blacksmith line and the other two in the wood-work line. My shop is sixty-two by thirty-four feet and two stories high. I have a six-horsepower Fairbanks-Morse gasoline engine. I believe it to be as good an engine as there is made. I have been running it for four years and have had no trouble. I can pull a 24-inch planer with it. I have a 36-inch band saw, a 16-inch jointer, and a 24-inch planer. They are all of my own make and give good satisfaction. I also have a boring machine, a drill press, a House cold-tire setter and an emery wheel. If I had to do without power machinery I would quit the business for the machinery makes work more like play. I can start my engine and machinery within a half minute of leaving my work bench. I have made a wagon tongue with hounds complete in two and a half hours. The only trouble I find is that it is a little dangerous for a man who gets in a hurry, but for a cool-blooded man it is all right. I recently lost one joint of my index finger on the left hand on the same day I got your paper and the first thing I read was where one of my brothers had cut the same finger on his hand.

Keep on publishing the prices, they are the first thing I read. I learn by them that I have a right to charge a little more for some of my work. I get seventy dollars for a three and a quarter farm wagon. I handle farm implements and gasoline engines as a side line.

I would advise every maker to put in machinery and a band saw, jointer, and boring machine. If any one would like to know anything about my machines I am willing to let him know. I am ready to help. W. F. Segelhorst, Illinois.

A New Zealand Price List.

The accompanying schedule is the Digitized by

agreed price list of the Wangunai Farriers' Association of New Zealand.

но	10.00
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MEW DHUES.
Heavy draught 8s. —(\$1.94)
Light draught 7s. $-(1.70)$
Light draught 7s. — (1.70) Young draught, heavy 9s. — (2.19) Young draught, light 8s. — (1.94)
Young draught, light 8s. —(1.94)
Stallions (in season),
beauty 17a 6d (4.95)
heavy
heavy
Hacks 6s. —(1.46)
Ponies 6s. —(1.46)
Race horses (stallions) 7s. —(1.70)
Race norses (filles and
geldings) 7s. —(1.70)
Young hacks and ponies. 6s. —(1.46)
geldings) 7s (1.70) Young hacks and ponies 6s (1.46) Polo ponies and hunters . 6s (1.46)
Removes.
Heavy draught 4s. $-(\$.97)$
Light draught
Stallions (in season).
heavy
Stallions (in season), 10s. —(2.43) Stallions (in season) light 6s. —(1.46)
Hacks 3s. —(.73)
Ponies
Ponies
OLD SHOES.
Draught, heavy 5s. —(\$1.22)
Draught, light
nacks 38. od.—(.85)
Ponies 3s. 6d.—(.85)
Extras.
Racing plates 10s. —(\$2.43) Racing plates (put on) 12s. —(2.92) Toes, draught horses, each Steeled shoes each point Steeled shoes each point 3d.—(06)
Racing plates (put on). 12s. —(2.92)
Toes, draught horses, each 3d.—(.06)
Steeled shoes, each point 3d.—(.06)
Steeled shoes, each point 3d.—(.06) Welded toe clips, each 3d.—(.06) Bar shoes, each 2s. 6d.—(.60)
Bar shoes, each 2s. 6d.—(.60)
Leather soles, backs, each 9d.—(.18)
Leather soles, draught,
each
Stringhalt horses to be charged for
extra time over one hour.
All young horses to be charged for extra
An young noises to be charged for extra

All young horses to be charged for extra time over one hour.

WALTER R. MORGAN, New Zealand.

New shoes, each (factory)	5 .30
Shoes up to No. 5 and larger	.35
Hand-made shoes	. 50
Setting shoes, each	
Bar shoes calked, each	. 40
Bar shoes plain, each	.35

Most all of the work I do is horseshoeing.

CLYDE CRAIG, Ontario.



A SHORING SHOP OF CANADA

Tire Bending and Axle Lengths.--In reply to Mr. Sawyer, of Iowa, I will say that his method of cleaning mud from a horse is just the same as we use here in the suburbs of St. Louis. About the tire; in bending, the middle of the tire stock remains the same length as when it was straight. The inside shrinks 31 times the thickness of the tire while the outside will stretch 31 times the thickness of the tire. So if he wants the tire when bent the same size of wheel, he will have to cut tire 31 times the thickness of tire longer than his mark after rolling the wheel on the tire. If his tire is 1-inch thick he will have to allow 31 times 1, which equals 1.57 and his tire will be the same size as the wheel. Now, 3; is not just the exact figure but is close enough.

In reply to Mr. E. Cronin, of Illinois, will say there are several ways of getting the length of axles and I have used them.

look forward to the coming of each number as I would to the coming of a particular friend. I enjoy the many letters from other brothers of the craft. Thornton's letters and Benton's talks are fine. And I enjoy the plans of doing things that are given now and then, many of which I have adapted to the lessening of labor and resulting in a better job. I think that in this way we can be a help to make "Our Journal" better. And I notice a kick now and then, and there are things sometimes to be enjoyed even in a kick. I remember a brother away back in the November number who offered a kick on the October number. This brother takes offense because there was too much space taken up on gas-engine talk. Now, as I live in a country where the gas engine and the other machinery which we are able to run with the engine saves us so much labor and enables us to do so much more and better work, I took especial interest in



A GENERAL SHOP OF MONTANA, RUN BY MESSRS. GILMER AND LEGGITT

The simplest way is to get the distance from the face of the spoke at hub to back end of box, or where box will be when set in hub. If it be four inches in each wheel that will be eight inches in both wheels. Chicago street car tracks are four feet eight inches, while St. Louis tracks are four feet ten inches. Now four feet eight inches less eight inches, the distance between spoke and the end of the box on the two wheels would leave four feet which would be the length of the axles from out to out of collars on a Concord axle. If a half-patent axle is used it would be the length from inside to inside of the collars. I plumb my spoke from center of spoke, top and bottom, instead of the face of spoke as Mr. Cronin does. So if his tire extends out 1 inch on each wheel past face of spoke, that would make his wheel four feet nine inches wide; consequently, he will have to make his axle one inch shorter. Instead of four feet it should be three feet and eleven inches. If Mr. Cronin does not understand this and will write me, giving me his address, I will make a drawing for him, also explain some of the other ways of getting the WILL O'GORMAN, Missouri. length.

A Letter and a Timely Kink.—I greatly appreciate The American Blacksmith and

this October number which my horseshoeing brother was kicking about. We have nice smooth roads; therefore, we do not have much shoeing to do in my locality. so the articles on shoeing are not so interesting to me. Yet, I do not wish to complain of them.

I wish to give here a little kink that we used some time ago in my shop. Our elevator man had let the water freeze in his engine and a cracked jacket was the result. There was just room to put a neatly fitted band on this jacket. In my hurry, mixed with a little carelessness, I turned this band (which was eight inches in diameter, three eighths of an inch thick, and three fourths of an inch broad) a little too loose, so that it would just drop over the jacket without having any draw. Now, I didn't want to throw this band away and make a new one, nor mar it all up trying to shrink it, so I just puckered up my mouth and began to whistle while I thought. I can always think better when I whistle, yet I am no "Whistling Rufus." I took that band and heated it to a bright red and then dipped it a trifle over half its width into the water; then other side down, repeating this operation about four times, when to my delight it fitted tight without a scar on the band. WALTER McCoy, Kansas.

Herbert Jenner, patent attorney and mechanical expert, 608 F St., Washington, D. C., established 1883; I make an investigation and report if a patent can be had and d for full information. Trademarks registered.

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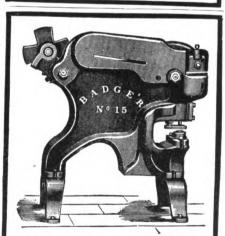
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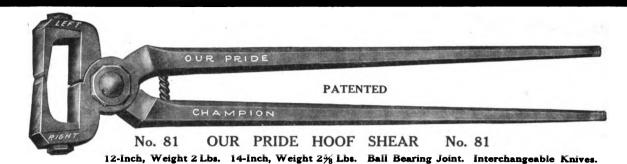
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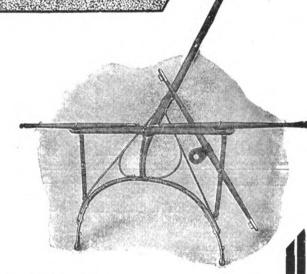
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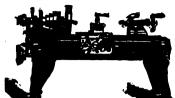


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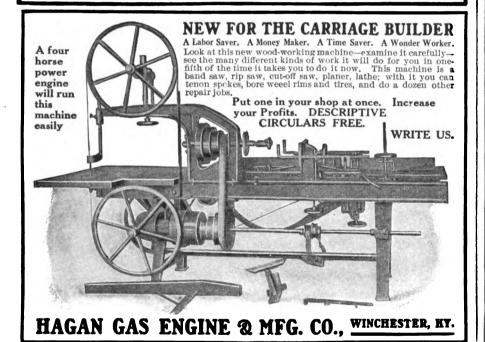
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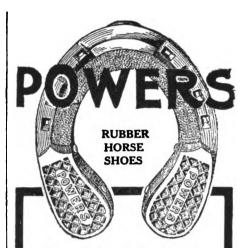
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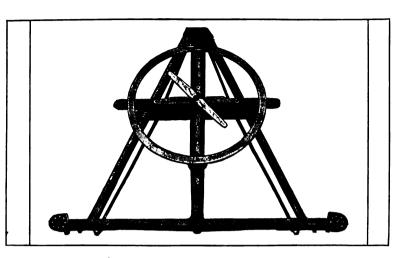
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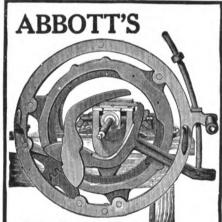
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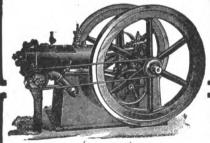


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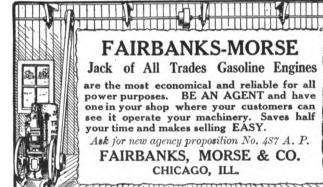
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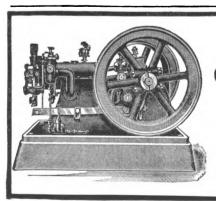


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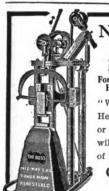


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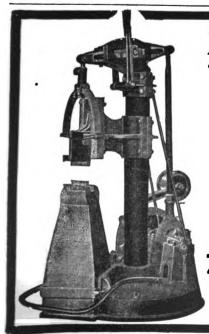


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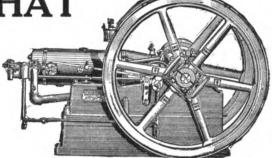
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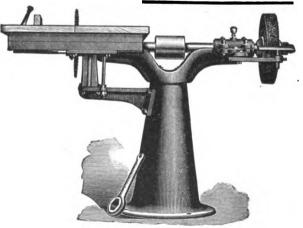
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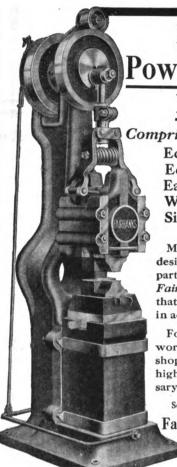
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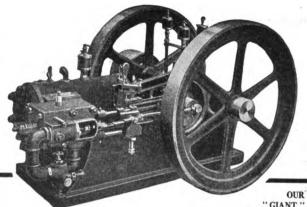
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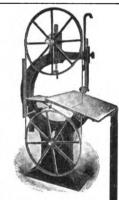
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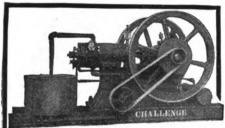


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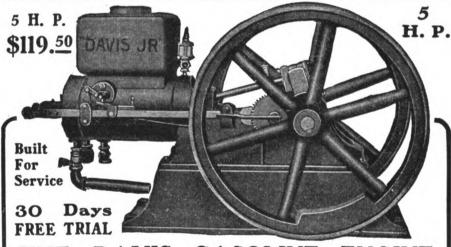
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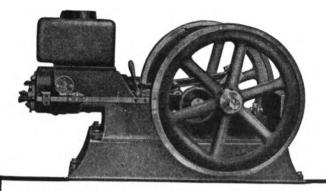
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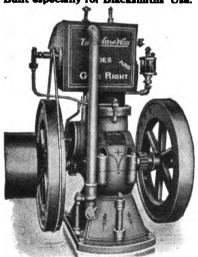
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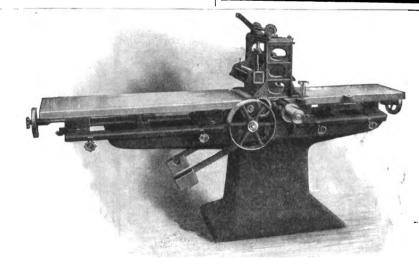


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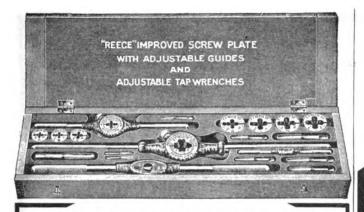


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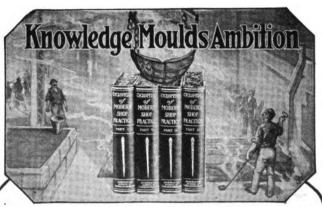
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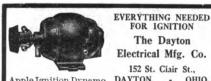
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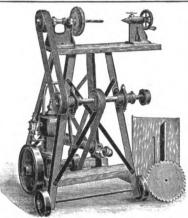
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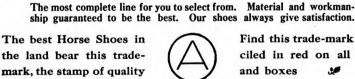
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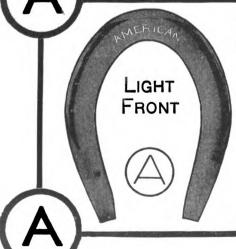
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Our Illustrated Catalogue shows all sizes and patterns. The book is free. We will gladly send a copy to your address. Write today.

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Thousands of Blowers Sold 30 Years Ago are Still in Good Working Order

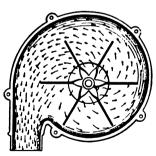
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Made Right or Left Hand at No Extra Cost

Why Buffalo Blowers Give the Strongest Blast with the Least Effort

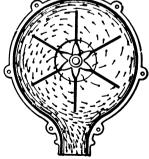
The scroll shaped fan case distinguishing the No. 200 Buffalo Blowers has been adopted only because of its proven efficiency in delivering the most powerful blast. This advantage is made clear by the illustrations herewith, which show the course of air currents in both scroll shaped and pear shaped fan cases.

Which One Looks Best To You?



The BUFFALO Way

The outlet of the scroll shaped case is right in the path of the air currents, affording the easiest means of escape. All the air produced with each turn of the fan is delivered through the outlet. No air is carried past the opening and forced around the fan case a second time.



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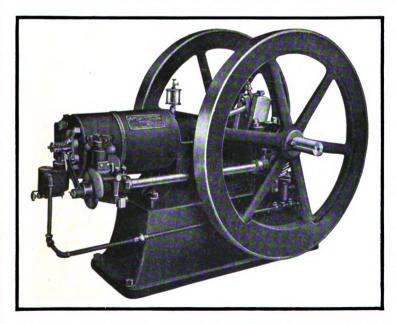
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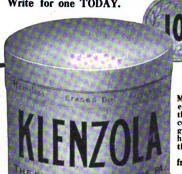
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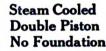
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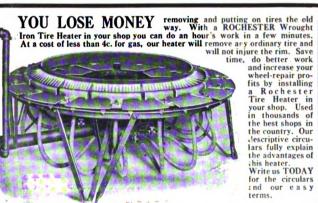
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10

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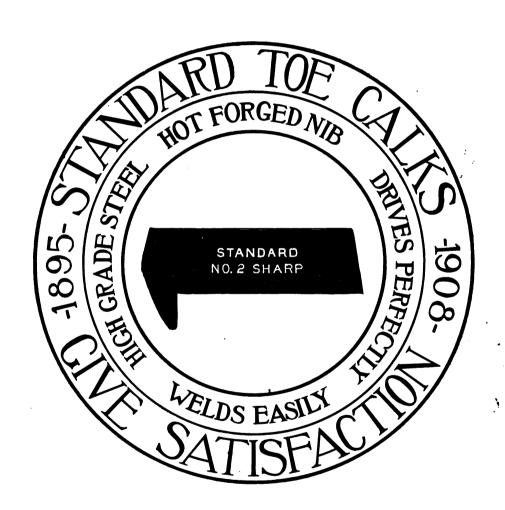
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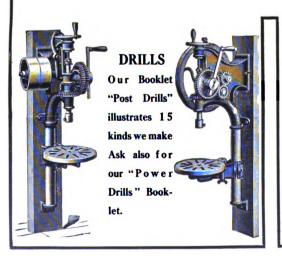
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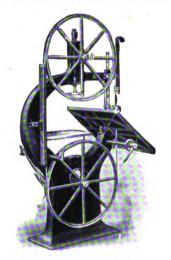






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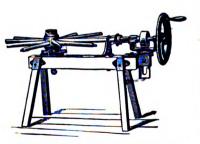
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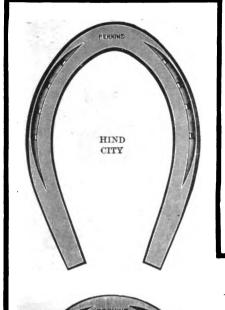


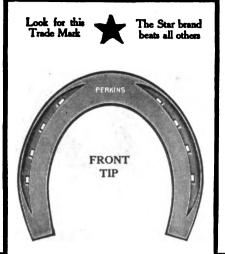
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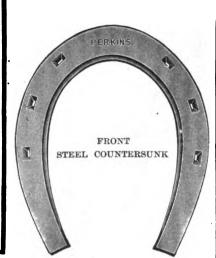


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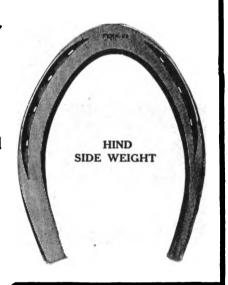






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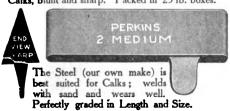
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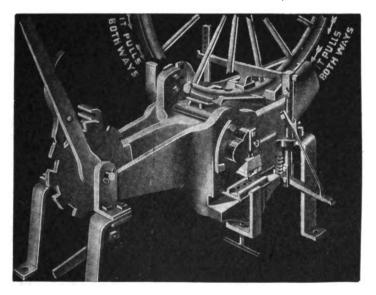


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HIS IS THE MACHINE TO BUY. It does the work eight times quicker and better than the old way. It is the only cold tire setter that has a punch and shear attachment, and our shear is a "GEM." Yet it is sold for less money than the other cold tire setters that haven't any shear and punch, besides it is ten times better than any other make, to say nothing of the shear and punch. The proof of what we say is in the fact that we have five times as many machines in successful use as there are of any other kind. So don't waste your time and money but send us your order.

HOUSE COLD TIRE SETTER CO., 216-220 S. Third St., ST. LOUIS, MO. J. H. HOUSE, - 201 Church St. - Toronto, Ont., Canada.

Blacksmiths Make Money Clipping Horses

Stewart No. 1 Ball Bearing Horse Clipping Machine

> A new branch—and a really profitable branch—can be added to any blacksmith shop at a total outlay of \$7.50. Just seven dollars and fifty cents (the price of the world's best horse clipping machine) stands for a bigger business for you. Put a machine in this week. It will pay for itself and start paying dividends within a month.



Horses Need Clipping

This is the proposition as far as blacksmiths are concerned. Horses need clipping—owners realize that. Clipped horses look, feel, work and sleep better than unclipped horses. They can also be cleaned in one fourth the usual time.

Who is more competent to clip horses in your locality than yourself, Mr. Blacksmith? Who is in a better position—has more chances of getting the business—can give such satisfaction—as yourself. Take hold of this opportunity before somebody else does.

Prepare For More Profits At Once.

The Blacksmith's Machine

The "Stewart" No. 1 is essentially the blacksmith's machine. In principle, in manufacture and in operation it shows marked superiority over the usual type. Trashy, imitation machines may be a few cents cheaper but that's where their talking points end. For economy's sake buy a "Stewart."

The gears on the "Stewart" No. I are cut from the solid steel bar and made file hard. Every gear is enclosed, protected and swims in oil, so that friction and wear is practically eliminated. Six feet of high grade flexible shaft allow every part of horse to be easily reached. Knife is the Stewart one-nut pattern—world famous for its simplicity and perfection.

Honest Value of the Stewart No.1

is for the machine complete, F.O.B. Chicago, But you need only send \$2.00 with order and machines comes C.O.D for balance. Or obtain from your supply house. We make clipping machines as low as \$5.00 but, service considered, our \$7.50 machine is the best ever marketed. Catalog and full literature cheerfully sent on request.

Chicago Flexible Shaft Co., - - 186 Ontario St., Chicago

DN BBBBBB

Send for our book

We would like to have permission to send you a copy of our Catalogue, showing the different styles and sizes of poles and shafts manufactured by us.

The PIONEER BRAND has been brought to a standard of excellence in quality and style, the result of years of labor and study of the trade's wants, and is recognized as the peer, as is attested to by the most critical manufacturers, and is demanded by all buyers of vehicles throughout the country.

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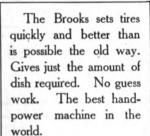
The Pioneer Pole and Shaft Company, PIQUA, OHIO

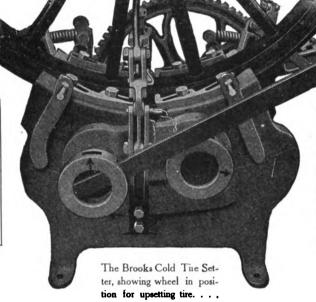
IRONING FACTORIES—Anderson, Ind.; Troy, Ohio; Sidney, Ohio; Cincinnati, Ohio; Canton, Ohio; St. Louis, Mo. BENDING FACTORIES—Piqua, Ohio; Troy, Ohio; Akron, Ohio; Wellington, Ohio; Ashtabula, Ohio; Muncie, Ind.; Anderson, Ind.; Memphis, Tenn.

NOW IS THE TIME

TO ORDER A

BROOKS





The Brooks sets the tire cold. No burnt surfaces to wear away. No steam and watersoaked felloes to shrink or split and loosen the tire. Simple, cheap, durable.

NATIONS PREPARE FOR WAR IN TIME OF PEACE

Just so in your business, prepare for next spring and summer's trade by buying a Brooks Tire Setter now. Those in your locality will quickly learn that you have a Brooks; that with it you can set tires in a few minutes time, without removing tire or bolts; that it greatly strengthens the wheels and gives just the dish required; that customers can drive up to your shop and in twenty minutes drive away again, with all four wheels as tight and sound as when they first left the factory, and good, clear profit money in your pocket. All this with a Brooks Cold Tire Setter. You will get new business. Trade that is going to other shops will now come to you. Why? Is the question hard to answer? So, when next spring and summer comes around your shop will be humming with business. Not only tire setting, but other trade will come to you because you have a Brooks.

THE U. S. GOVERNMENT USES BROOKS TIRE SETTERS

The United States government shops use many Brooks machines, which are giving excellent satisfaction. The government, after testing other cold-tire setters made a report on the Brooks, which is now on file at the Capitol, at Washington. An extract from their report on the Brooks follows: "The Superintendent of Transportation and the Blacksmiths in this Department here pronounce it the best machine for the purpose, giving perfect satisfaction on all the different tires we have in use." The government says: "PERFECT SATISFACTION." Is this not a highly satisfactory guarantee? Can you ignore it?

WRITE US TODAY FOR OUR SPECIAL OFFER

We will put a Brooks in your shop and it will pay for itself in a remarkably short time. We can vouch for this from experience—thousands of blacksmiths' letters to prove it. Write us now—today—for our special winter offer, on terms which will be satisfactory to you. Our offer will surprise you. The Brooks is made in different sizes, to set all widths of tires.

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WRITE FOR OUR NEW BOOKLET, "OF INTEREST TO BLACKSMITHS," ALSO A HANDSOME POCKET MEMORANDUM BOOK FREE. A POSTAL CARD WILL DO.

THE BROOKS TIRE MACHINE CO.

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We know you must have goods in a hurry, when you have a repair job, such as extra poles, shafts, wheels, seats, bodies, gears, tops or any similar vehicle parts. We are able to make a special feature of prompt attention to such orders. This alone should induce you to send for

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Cures Strained Puffy Ankles, Lymphangitis, Poll Evil, Fistula, Sores, Wire Cuts, Bruises, Swellings, Lameness, and Allays Pain Quickly without Blistering, removing the hair or laying the horse up.

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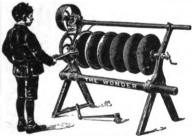


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are in use in 36 states, CANADA and MEXICO. For sale by leading jobbers throughout the United States and Canada.



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The LITTLE WONDER will sharpen any size disc up to 22 inches in diameter. The accompanying cut shows the LITTLE WONDER at work on a whole section of discs. This machine is especially adapted for sharpening Disc Harrows.

The GIANT WONDER is a larger and heaver machine; has holder attachments for rolling coulters and disc plows; will take in discs up to 32 inches in di-ameter; is a geared machine and will also take in disc harrow sections same as the Little Wonder and do the work equally as well. The only machine on the market with these advantages.



Can shear any part of edge to any bevel.
Can shear back from edge as far as required.
Can use tool on either side of disc.

Can do all this without the turn of a set screw or

nut; is a positive feed; automatically adjusts itself to wobbling or bent discs; knives made of best grade, self-

tempering steel, will last a lifetime for hand and power.
FULLY WARRANTED. We pay the freight

Can shift from one disc to another.

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THE GIANT WONDER.

Write to us direct if your dealer cannot supply you giving us his name and address. Send for circulars.

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It may not be altogether your fault when the boss talks like this. You may be working at the wrong job; or it may be the job is the right one but that you don't know enough about it to "make good."

In either case the International Correspondence Schools can help you. The business of this place is to raise salaries by imparting to poorly paid but ambitious men, in their spare time, the knowledge that fits them for their natural line of work.

Never mind how long your working hours are, where you live, how little schooling you have had, or how little you earn—mark the coupon. This great salary-raising plan will be adapted to your personal needs and circumstances.

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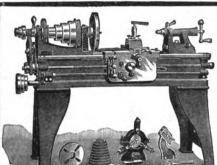


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For the small power user there are no better engines made. Their construction combines strength, simplicity and economy. Backed by the most accurate workmanship, made of the highest grade of material, every part interchangeable, our engines give years of satisfactory service. Learn more about them. Our big illustrated catalog mailed free on request,

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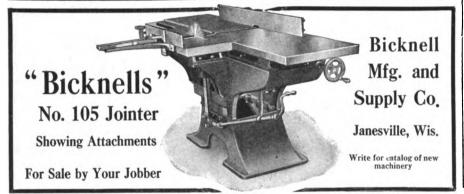
Our new 15-inch engine lathe, with all time and labor-saving improvements, heavy and substantial, a modern, practical, high-grade lathe, is the best for your shop.

It's a SEBASTIAN-a good lathe Investigate its merits-Write for Catalog.

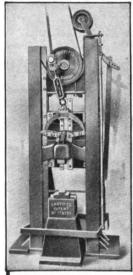
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MADE OF STEEL Every Part Riveted

It is the strongest It is the strongest and most durable hammer made. The best all-100 ham-mer for blacksmith and wagon shops. It will not get out of order; will not work loose.

This machine will help you do better, quicker and cheaper work. Get our full description and prices.

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AIR CUSHION RUBBER HORSESHOE NO



See That Cushion? It fills with air at each step. That's what breaks concussion. That's what pre-vents slipping. That's what keeps the foot healthy. That's what cures lameness.



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Tested thoroughly and guaranteed strictly as represented.

Note the great advantages of The Bruce Maileable Iron Bolster Standard over the old style.

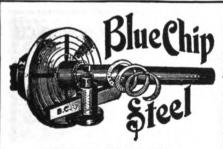
1. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers,
2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster. which in old style is weakened by mortise.

3. The Malleable Iron Standard has a 3 1-2 in. face at base which prevents wear on wagon box, while the old style has only a 7-8 inch face.

4. Great time saver. Can be attached to boster in one-fourth the time required to put on wood stake. Adapted to new and repair work.

If you have never tried the Bruce Standard, Write today and ask for prices.

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Will turn off blue chips on any kind of work.

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CHICAGO" **EMERY WHEELS CUT QUICK**

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.



WHEELS SAVE TIME

They're made of stuff that cuts

Emery Wheels, Glue, Emery, Pelhing Wheels, Grinding Machinery

136 Page Catalogue for the Asking

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The Celebrated Gillette Horse Grooming Machines

The Guarantee we give you with our Machine is as good as a U. S. Gold Bond.

We are so far in advance of other machines in improvements that we really have no competitors. Gillette Machines give satisfaction in every way.

Our claim is as broad as words can make it. The Gillette Clipping and Grooming Machine is better than any other Clipping and Grooming Machine in every particular.



The Gillette Machines were the first Horse Clipping and Grooming Machines made in any part of the world. Many imitations have been put on the market, but none have ever reached our high standard.

Send for our 1908 catalogue and read about our New Patent Chain and Grooming Brush.

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THE O. K. HOOF REMEDY is the best specific on the market for Contracted Feet, Corns, Cracked or Brittle Hoofs, Scratches, Wire Cuts, &c. Blacksmiths can make money selling it to their customers. WRITE TODAY for Agents' Prices and Terms. Large sample, express prepaid, 25 cts.

THE O. K. STOCK FOOD COMPANY, 650 Monon Building, CHICAGO, ILLS-

STEEL WHEELS



To Fit Any Wagon Plain or Grooved Tire

Farmer's Handy Wagons All Standard Types

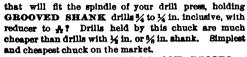
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BLACKSMITHS' HOOK AND HANDLE RULES

Made from hard rolled sheet brass, one-tenth inch thick, one and one-sixteenth inch wide, with heavy gradations and figures, graduated from the end in sixteenths of an inch on one side and from the inside of the hook in sixteenths of an inch on the other, adapting them for taking correct measurements from either the outside edge of a hot piece of iron, or from the inside when held against a corner. Graduated twelve inches, have flat handles and measure over all sixteen and three-fourths inches.

Price, postpaid, \$1.15. Catalog No. 17 AH of fine Tools free.

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NO. 5 COMBINED PUNCH AND SHEAR.

Punches $\frac{5}{6}$ in. hole through $\frac{5}{6}$ in. iron. Shears 5 in. x $\frac{1}{6}$ in. flat iron bars. Shears $\frac{1}{6}$ in. round iron bars, Shears 8 in. x $\frac{1}{6}$ in. band iron.

Our large descriptive circular will interest you. So will our price.

Badger State Machinery Co.

19-25 Trinity St. Janesville, Wis.

"NATIONAL" Malleable Iron Wagon Standard



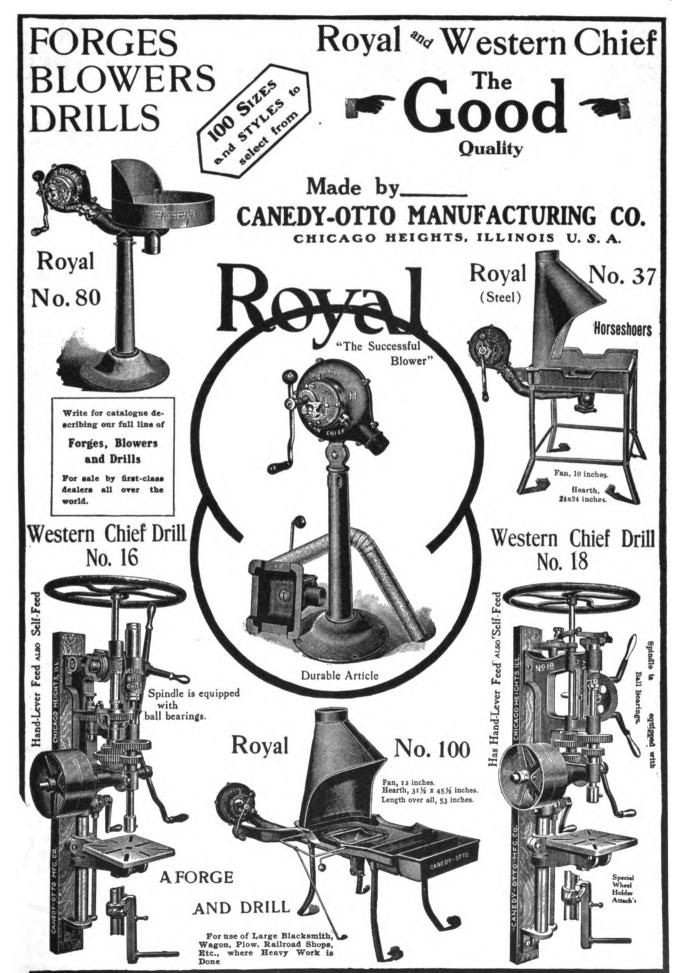
The neatest, best looking, strongest, easiest and quickest to apply, and in every way the best standard ever offered for sale.

Made in but one size and will fit any size of bolster. It's never necessary to trim the bolster to get a fit. Can be applied in twenty minutes—simply bore three holes and bolt on. Will pay a better profit with less work.

Price, \$1.65 per set of four standards. Cash with order. Ask your supply house for them or write us.

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ROTH FORGE BLOWER AND ENJOY LIFE

Write for interesting prices and bulletin No. 1611

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Look at the SPLICE JOINT

Gives your cus-tomer best value for his

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Ask your Jobber, or write direct to the

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"MARVEL" BLOWERS

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60.00 For 4 Heavy Tires -80.00 -

ALSO OTHER SIZES.

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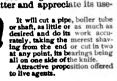
KELLER ECCENTRIC BRAKE

Warranted to lock wheels ease; can be applied to aid of rachet. Made in Note its construction, sturdy and serviceable.

> Particulars and Interesting Circulars

with three ton load with any wagon. Works without two sizes.

Blacksmiths, wagon and buggy repairers especially, will see at a glance the merits of this axie cutter and appreciate its usefulness.





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THE DAYTON



(PATENTED.)

FOR ALL LIGHT VEHICLES. USED BY LEADING MANUFACTURERS.

Made in High-Grade Malleable Iron.

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IMPORTANT

Axle Tie and Bear Perch Irons will be furnished for PLAIN AXLES unless SWAGED AXLES are specified when ordering.

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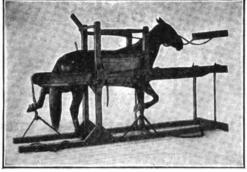
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Strong Durable

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Most Vicion Horse in 20

With these stocks the most vicious horse can be shod in twenty minutes without any risk to man or beast. When not in use stocks fold against the wall and occupy practically no room. Our shoulder rope secures the horse instantly so that he can't get away. The horse cannot lie down, rear or pull back with our fastenings. The feet are held firm and taut by a fiexible mechanism; no dangerous vise-like foot hold; impossible to injure or break a horse's leg. Two feet can be shod at the same time. Quick and easy to operate, easy on the horse and no strain on the shoer. In releasing horse you simply pull a lever and the sling drops from under him. These stocks have been tried and tested for years, and are used by the United States army. Write for descriptive circular, price list and testimonials. Terms and prices liberal. You de not pay for the stocks until you have thoroughly tested them to your ewa satisfaction.

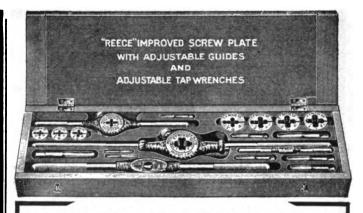


A NEW WAGON COUPLING WITHOUT A KING BOLT



Prevents wearing of Reach, Axle Tree and Sandboard, the weak place in a wagon. Easily attached to any wagon at small cost. With this coupling wagon will last twice as long. Made exclusively by Hemphill's Horse Stocks Company. Wagon manufacturers and black-miths.

THE HEMPHILL HORSE STOCKS COMPANY RENSSELAER, INDIANA, U. S. A.



BUY GUARANTEED SCREW PLATES

Backed by 34 Years Experience.

Greenfield, Mass., Nov. 1, '08.

To the Metal Workers of America:

We ask you to accept our \$16.37 Trial Offer and thus know from actual experience that Quality counts, and that the "Reece" Screw Plates are what we claim them to be—The Best in the World. Yours respectfully, THE E. F. REECE CO.

OUR GREAT TRIAL OFFER

On receipt of \$16.87 we will send you one of our No. 200 "Reece" screw plate sets, as illustrated above, with 2 "Reece" Adjustable Guide Stocks, 2 Adjustable Tap Wrenches and 9 sizes of Taps and Dies, cutting ½-20, ½-18, ¾-16, ½-12, ½-12, ½-11, ¾-10, ½-9, 1"-8, and all complete in a handsome wood cabinet. Our binding Guarantee accompanies every screw plate. Your money back if you are not satisfied. If your dealer cannot supply you, then WRITE US DIRECT.

THE E. F. REECE COMPANY GREENFIELD, MASS., U. S. A.



The Most Powerful Hand Machine Made One operation of the lever does the work. No changing required

One man on the lever cuts 1-2 x 4 in.

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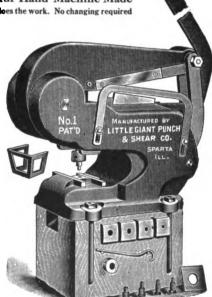
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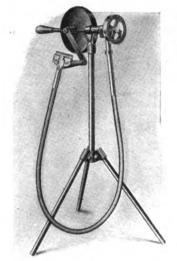
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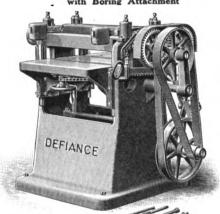
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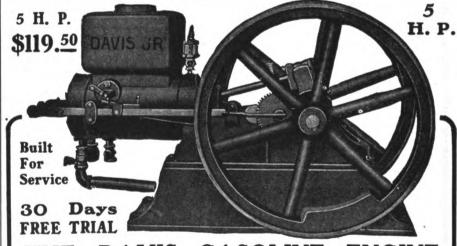
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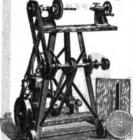
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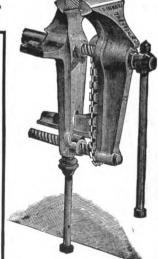
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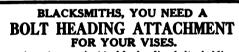
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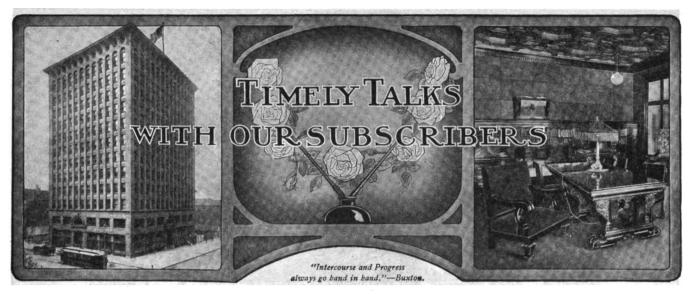


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Subscribers should notify us promptly of non-receipt of paper or change of address. In the latter case kindly give us both the old and the new address.

About Calendars.

There are still a few 1909 calendars left for those who have been prevented from ordering earlier. But if you don't order just about as soon as this reaches your eye you're very likely to be disappointed. The calendar, this season, is beyond any possible doubt the very best we have ever published. The subject is just brimming full of life and being on heavy cardboard, it makes a calendar that anyone may feel proud to call their own. Your customers will gladly keep it and give it the place of honor among their home calendars. We are able to deliver calendars in about five days after receipt of your order, so you need not be afraid that your calendars won't come in time for your needs. But send your order now. We cannot guarantee delivery unless we hear from you immediately—so order now if you desire to present a calendar to each of your customers. The sign over the shop door is read by passers-by only. A worthkeeping calendar will carry your signyour business card—to people who never pass your shop and will keep it there.

Change of Address.

We have mentioned this matter so often that we are almost afraid to say anything about it at all, but the necessity of speaking about the matter is impressed upon us in every day's mail. When a subscriber changes his address and advises us of the fact but fails to state what his old address was it is almost impossible for us to locate him in our files. This makes it absolutely necessary for you to give both your old address and also your new address. And don't leave it to the letter carrier, postmaster or rural carrier to notify us. Do it yourself, 'twill take but a minute of your time and when done, you know beyond a doubt that it's done. So please remember, give both the old and the new addresses when you move.

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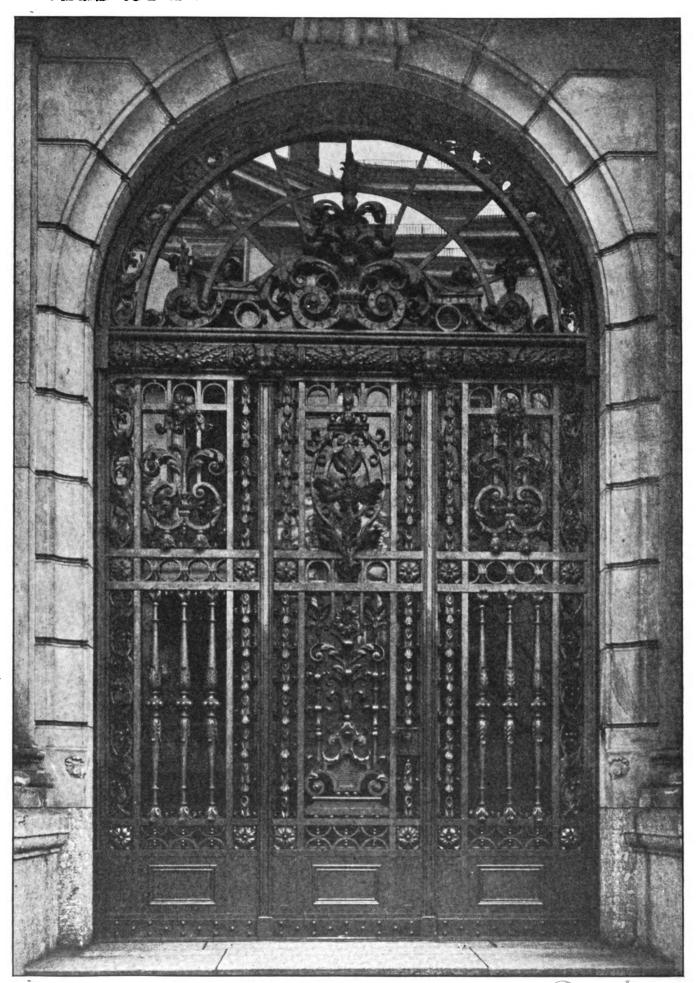
A Look Forward.

The coming year will see many new features in "Our Journal." It will see a journal, bigger, broader, and more valuable than ever before. And we, of course, are planning far in advance. Even now we are laying foundations for an automobile number to appear in the spring-a number which will be as far ahead of anything else as the auto is ahead of the ox cart. And we want your co-operation in building this automobile number. If you have built a motor vehicle of any kind tell us about it. Give us all the information you can. Tell us what you do in the auto repair line. Photographs and sketches will be warmly welcomed by the Editor. Then there is the annual shop number—"the best num-ber of the year'' some say. If you haven't sent in your shop photograph for publica-tion, do so some time between now and spring. The shop number issued in June of this year was a mighty good number, but we can do better and we're going to with your help. If your contribution doesn't come under any special head, send it in just the same. We are always glad of the help of "Our Folks." We want your co-operation.

A Fair and Square Deal.

We have said much concerning our Pink Buffalo Stamps, our Honest Dealings Paragraph, and our stand against the dishonest dealer and manufacturer. And we practice what we preach. We insist upon delivering a fair deal and a square deal in every transaction. And we want to know it when you think you don't get it. We cannot, of course, square a thing if we do not know what to square. If you have a complaint to make, make it to us today. Don't take it to your neighbor—tell us your troubles and give us a chance to straighten them out. We cannot right a wrong unless we know about the wrong. If you don't like the paper tell us, if you do like it tell your neighbor and invite his subscription.

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AND forged work dates back to the time of Tubal Cain, who, as is generally known was "an instructor of every

artificer in brass and iron." We find. however, contrary to the general belief at the present period, that the ancients used iron only when other metals would not serve the purpose. For articles of show and luxury the brilliancy of bronze and the precious metals was given preference, while weapons and utensils were fashioned from iron. This disposition of the ancients is shown to a greater or lesser degree in practically all collections of antique metal work. It will be noted in museum collections generally that the handsomer specimens of metal work, those showing the greatest skill and ornament, are of bronze, brass and the precious metals.

It remained for our forbears of the middle ages to introduce iron and bronze work into the field of architecture and to discover styles suitable for use in this field. And it is from these mediæval smiths that we of modern times have gotten some of our best ideas. Some of these early specimens show astonishing skill, and when we realize that the hammer and the anvil were the only tools used by these workers our wonder may well increase. An example of the skill exercised by some of the earlier metal workers is shown very strongly in a bronze now in the British museums and dating back to the fourth century before Christ. This bronze shows in very high relief the figures of a Greek warrior and an Amazon in close conflict. The heads of the figures are nearly detached from the ground and the metal in the higher portions is little thicker than paper, yet in no part is the metal broken through by the punch. Other instances of the exceptional skill and ability of the early smiths can be found in all the large museums. And these examples are in many cases without parallel in our own time, despite our modern tools and appliances.

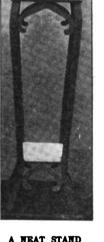
The growth of ornamental-iron work

Ancient and Modern Ornamental Work in Metal

J. C. CORWIN

during the middle ages can be easily traced. First we find the iron smith's trade called upon simply for the utility

> of its product. That is, hinges, door furniture. grilles and the like were of the simplest designs and calculated to meet the needs of



A NEAT STAND

utility only. time went on simple ornamentation was added and gradually ornamentation assumed the foremost position. From then, ornamentation was developed to a higher and higher degree until, as now, it was used freely in softening the hard

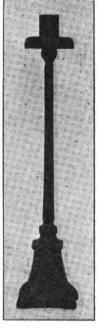
lines of the articles of pure utility. From the simple tongue hinge and the crescent-shaped straps of the early part of this period there was a gradual evolution to the rich scrolls which were twined over the entire surface of a door.

The gradual climb of art-metal work of the Romanesque and Gothic periods from the extremely simple and plain work of the early Romanesque workers to the period when ancient work reached its zenith can be but briefly mentioned. A characteristic of Romanesque work is the slitting of iron bars and the scrolling of the parts thus formed. Separate bars were also welded together in the middle while the ends

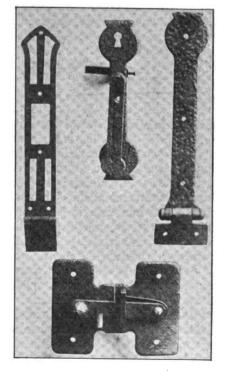
were forged to form leaves or other ornamentation. Parts of large pieces formed in this manner were then held together with collars and bands instead of rivets or nails.

The Gothic period finds the art worker joining his grilles with rivets. forging separate parts and after welding the frame and body of his grating together attaching loose forgings with rivets. Gradually the leaf work of this period became more complex. The bars were hammered out to thin sheets and then given a definite and bold form and embossed. Graving tools and chisels were added to the metalworker's equipment and resulted in still richer and more beautiful work.

The beginning of the Boroque period marks, according to some historians, the decadence of art-metal work, while the Renaissance age marked its zenith. The armor of the latter period was of the most solid and luxurious description. Gold and silver were used to embellish the weapons of offence and defense, while etching, engraving, embossing and fretting rendered the work

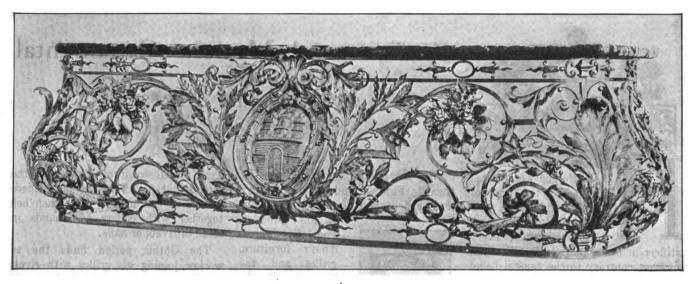


FOR THE CANDLE



SOME ARTISTIC DOOR FURNITURE

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A BALCONY RAIL IN ALUMINUM BRONZE FOR NEW TOWN HALL AT HAMBURG, GERMANY

triumphs of art. These processes, as is but natural, were adopted gradually by the architectual smith, and the principal centers of the armourer's art also became renowned as general art-smithing centers.

The Boroque and Rococo periods added their mite to the styles in smithing art, but not in such large measure as the previous periods. This is perhaps the reason for the general impression of decline usually associated with these two ages as regards art smithing.

Modern ornamental-iron work is necessarily a development of the ancients and, naturally, we find not merely traces of but wholesale contributions from the early periods. Styles and fashions of ornament have come to us from across the centuries, have stood the test of ages and are yet considered highest art. Several examples of modern ornamental work are shown on these pages and even the layman can pick out the rosettes, stars and scrolls of the Romanesque period, the boldlycurved, long-drawn-out designs and the crab-like leaf forms of the Gothic age, the intricate scrolling of the Renaissance and so on through the Baroque. Rococo and Empire styles. Modern work is not a mere mixing but a blending of the ancient styles of art-smith work. The iron gate in the frontispiece, for instance, shows the thumbmarks of several ancient periods. This particular specimen is from the works of Armbruster Brothers, of Germany, and is at the entrance to a commercial house. The piece shows excellent composition and is, of course, finely executed.

The house of Armbruster Brothers is world-famous for its art-smith work and they not only work in iron but in bronze, copper and combinations

of metals as well. The balcony rail in aluminum bronze is another example of their work. This piece is highly ornamental and shows exceptional skill

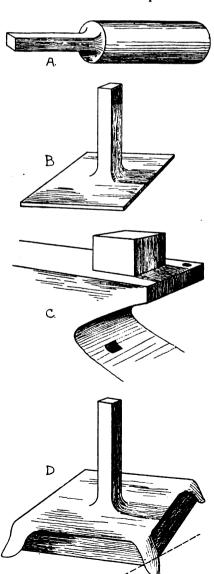


FIG. 1.—VARIOUS STEPS IN MAKING CANDLE STICK BASE

not only on the part of the metal worker but the designer as well. It is by no means an easy matter to design a piece with much ornamentation and not have its several parts clash. It requires a fine sense of composition and an understanding of true artistic effect.

A third example of work by this German firm shows the front gate and a balcony of the residence of Mr. Hugo Armbruster. The same engraving shows a window grille, but not sufficiently distinct to show its beauty. Both gate and balcony are excellent pieces of work and are pleasantly free from over-ornamentation.

The examples shown and detailed being of German design and make must not be confounded with American artmetal work. In this country we lean more strongly to the plainer designs, using scrolls less frequently but with equally artistic effect. Several specimens of true American small work are shown on the page opposite the frontispiece. These are all from the forge of Mr. Thomas F. Googerty, who has devoted many years to the study of ornamental iron work. The reader will note that simplicity is the very beauty of these examples. Can anyone imagine a stand more truly artistic than the one shown? It requires skill, judgment and a keenly artistic eye to forge articles in this simple style and our American art-iron workers are tending more and more in this direction.

The cartouch used in connection with the initial is another example of the work of Armbruster Brothers.

A Base for Candle Sticks.

T. F. GOOGERTY.

The base of a candle stick may be round, hexagonal or square, or its shape may be suggestive of some plant

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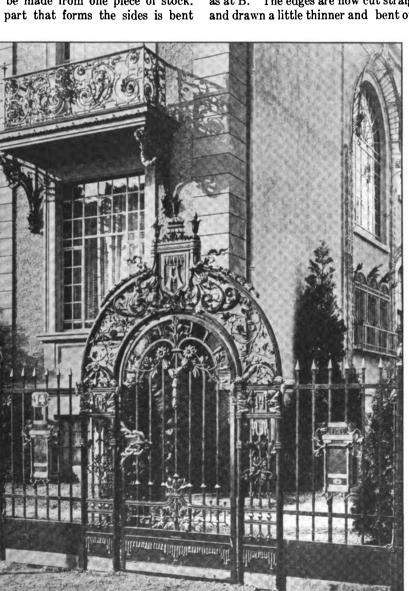
form, or rather ideas from plant form. Good design in iron work should be conventionalized and not represent nature as it really is. Gaudy and realistic designs are unartistic and are simply made to sell, they do not appeal to the artist.

Fig. 2 shows a candelabra with a square base. The top of the stem represents branches which interlace one another. A socket at their ends is to hold the candles. The base is not a solid piece of metal, but is hollow underneath, the shape of a box, with the stem growing out of the top as shown.

It is made in box form in order that it may be light in weight and still have the appearance of stability. In forging this base the stem may be welded to a flat plate or the whole may be made from one piece of stock. The part that forms the sides is bent

over and the corners worked square with a hammer.

In forging part of the shank and base from one piece of metal a round or square bar of mild steel should be used. The first thing to do is to determine the size of the base and the amount of stock needed. In this kind of forging plenty of stock should be allowed, as it is better to have too much than to be short when finishing. After the stock is cut it is heated and drawn square on one end as shown in Fig. 1, at A. The heavy part is now heated and the square shank inserted into the square hole of anvil or a heavy block of cast iron with a countersunk hole in it and the piece flattened by hammering with sledge hammers until it is about three sixteenths of an inch thick. The piece will now appear as at B. The edges are now cut straight and drawn a little thinner and bent over



FORGED IRON GATE AND BALCONY AT HUGO ARMBRUSTER'S RESIDENCE, FRANKFORT, GERMANY



FIG. 2.—THE CANDLESTICK COMPLETE

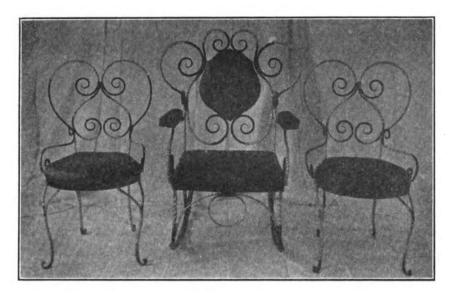
to form the sides. This is done by hammering them over a square block that fits the square hole in anvil, see block at C. After the sides are bent the corners will bulge out and get longer as shown at D. They are cut off as shown by the dotted line. Each corner is now heated and hammered square with a light hammer and after the work is cool the bottom edges of the sides are ground straight on an emery wheel. It is now reheated and all of the corners hammered square.

The base is now ready to have the stem finished. This is done by working out a top part and welding it to the base and then finishing the whole. A base of this kind may be made by jump welding the shank onto a thin plate, using the Laffitte welding plate. Lamp bases may be made in the same manner working them up round or square and drilling a hole through the stem for the electric wires.

An Artistic Suite of Furniture.

The accompanying engravings show a five-piece suite of furniture, consisting of two small chairs, one large chair, a rocker, and a sofa, which I made during spare time. The frames for the seats are made out of 11 inch by 1-inch angle steel. The legs of the large chair, rocker, and sofa are made of §-inch square iron, while the legs of the small chairs are of ½- and 3-inch square iron welded on for crotch braces. The backs of this suite of furniture are made of \(\frac{3}{6}\)-inch square iron. ▶ I made the rockers of 1-inch channel steel, and then put on 1-inch Morgan and Wright rubber tires. I fastened these on with screws. I also

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PART OF THE SUITE OF IRON FURNITURE

upholstered the suite with leather, and I painted the square parts black and the twisted parts I bronzed with gold, and it made a good contrast. The crotch braces and rings are made out of \$\frac{2}{3}\$-inch square iron. The shields are made of white wood, and are held by a flat piece of No. 14 sheet steel.

A Music Stand of Ornamental Iron.

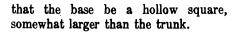
The accompanying engraving shows a music stand hand forged by Mr. C. A. Marceau, of New York State. The frame of the stand is of angle steel, while the legs are of $1\frac{1}{8}$ -inch round edge tire steel a quarter of an inch thick. The scrolls are of $\frac{5}{8}$ by $\frac{1}{6}$ -inch and $\frac{1}{2}$ by $\frac{1}{16}$ -inch stock. They are fastened together, and to the frame with rivets. The sides of the stand are hinged while the shelf is of wood and painted black. The stand is very well made, is neat and handsome, and shows much originality on the part of the maker. A

stand of this kind would be quite heavy; casters would be a convenience.

A Unique Candelabra in Wrought Iron.

The accompanying engraving shows a very unique piece of wrought iron work, executed by Mr. James A. Koehler, of Koehler Brothers, Michigan. As shown. a tree design was taken, the roots serving as the base, the trunk as the main column, while the branches, twigs and leaves were made to serve as holders. The entire product is forged from one piece and shows a thorough familiarity on the part of the forger with smith work. The work is free from that stiffness so likely to be seen in a piece of this kind, and shows an attention to detail and composition so necessary to success in ornamental work. It has been suggested that instead of the base

formed of roots

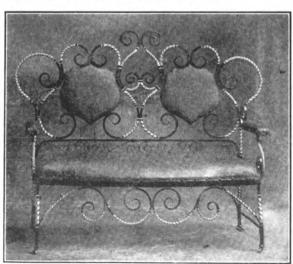


Two Ornamental Pieces of Graceful Design.

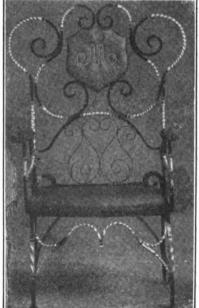
JAMES CRAN.

The engraving shows two ornamental pieces which I forged several years ago while foreman of the forging department of the A. G. Spalding and Brothers' shops at Chicopee Falls, Massachusetts. This work was done as a pastime, most of the pieces finished being given away.

The lily stands about fifteen inches high; the stem is hollow throughout, being made from flat machine steel about an eighth of an inch thick and butt welded the entire length. At the base it is split two ways, and the four ends drawn out and scrolled to form feet. The leaves, four in number, are welded on around the shank as shown. The only tools used in this forging were a hammer, chisel, and a hack saw to split the feet. The forging was intended for a table electric light. The snake and pipe are made in the same manner from flat machine steel, butted. It measures about twenty-seven inches all over when straight. The pipe is of the T. D., or clay, shape. It and the body of the snake are one piece. The head of the snake and the pip on the pipe are welded on. The snake at its largest diameter is about eleven sixteenths inches outside. At the tail it is less than a quarter of an inch. The shank of the pipe is about three eighths of an inch. The hole inside varies in size with the outside. At both ends it is less than an eighth of an inch. A little rasping was done on the pipe.





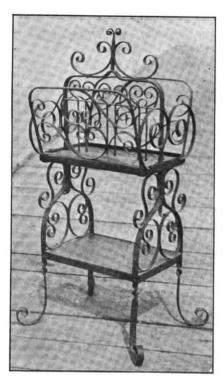


THE SQUARE PARTS WERE PAINTED BLACK WHILE

THE TWISTED SECTIONS WERE

TREATED WITH GOLD BRONZE

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A MUSIC STAND OF IRON

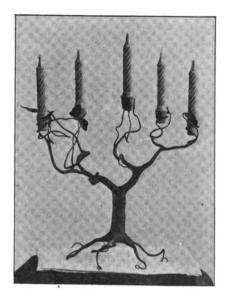
On the snake, the eyes, the holes in the nose, and the teeth were done cold. After the snake was done it was coiled to test the welding, not one bit of which showed up.

Ornamental Hammers and Miners' Candlesticks.

J. C. DOERFLER.

The accompanying engraving shows two ornamental goldminer's candle-sticks and also two fancy hammers. One is a double-clawed shoeing hammer and the other is a machinist's hammer. The candlesticks are made of 2½-inch automobile spring, the shoeing hammer is made of common pick steel and the machinist's hammer is made of hexagonal drill steel. These things I made last winter during my idle moments. The two candlesticks I worked on about a month. They are all handforged, drilled, filed, and polished.

I will now tell you about my work. I learned my trade as wagon and carriage maker at Volga City, Iowa; from there I went to Eagle Grove, Iowa, and ran a general blacksmith and wagon shop for fourteen years. The latter part of these fourteen years I learned blacksmithing and horseshoeing from my partner and hired hand. I lost my shop twice by fire and so I left Iowa and went to Colorado. There I conducted a shop eight years, partly with a partner and partly alone. Then when the great labor trouble came on at Cripple Creek, times became very dull

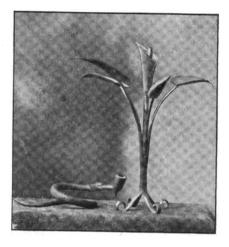


A UNIQUE CANDELABRA

and I sold out and came to Nevada. Goldfield was booming when I came here first and I had a job for two months at six dollars per day. That was very good, then the labor trouble came out here at the same time there was a panic in the United States and I lost my job and was idle all winter. That was how I came to do this piece of ornamental work and in the spring I started a shop for myself. Prices are very good here but about six blacksmiths to one job. I will give you a few prices:

Horseshoeing from\$2.50 to \$3.00 Setting tires from $\frac{7}{8}$ to

2 inches 6.00 to 8.00 Spokes from, each60 to 1.00



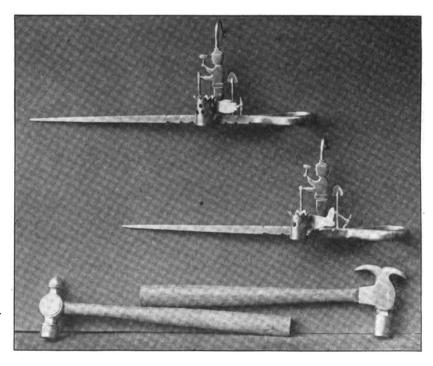
TWO ODD ORNAMENTAL PIECES

Felloes, each from\$1.00 to \$2.00 Setting axles from 3.50 to 5.00 New axle cap 3.50 to 5.00 New wagon tongue, pole

An Ornamental Center Table.

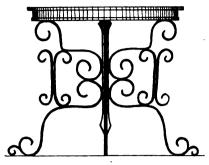
S. O. LOVE.

The accompanying engraving shows a center table which I made for my own use. The table top is round, two feet four inches in diameter, and is made of mahogany. The legs are made of thirty separate pieces of iron and twenty rivets and bolts. The center column for the legs is made of \(\frac{7}{4}\)-inch square stock with nine pieces of \(\frac{1}{4}\)-inch iron welded on one end and drawn to a point and twisted. The brackets or legs are made of \(\frac{2}{4}\) by \(\frac{1}{4}\)-inch



ORNAMENTAL HAND HAMMERS AND MINERS' CANDLESTICKS
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soft iron and riveted where they come together. The table is the same height as a regular center table with the legs nicely curved and proportioned on



AN ORNAMENTAL CENTER TABLE

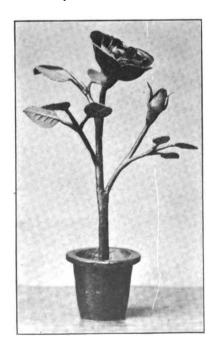
the four sides. The top could be made of walnut. The top on this one is made of mahogany.

An Odd Piece of Ornamental Work.

The very odd floral piece in ornamental ironwork shown in the accompanying engraving is from the forge of Mr. A. Christie, of Pennsylvania. It is made from Norway iron and shows considerable originality on the part of the maker. The flower itself is especially good and is proof of Mr. Christie's excellent workmanship.

A Grill for a Small Window.

The accompanying engraving shows a very neat grill for a ticket window made by Mr. T. A. Halliday, of North Carolina. The frame and crossbars are made of one by one-fourth-inch soft steel. The scrolls are made of flat wire one half by one eighth inch. All of



AN ODD PIECE OF WORK

the material was polished before shaping, and with the exception of the drilling and polishing every bit of work was done by hand. The general appearance of the grill is very neat, and Mr. Halliday is to be complimented upon his excellent workmanship.

Thornton's Letters.—22.

Being "Straight-from-the-shoulder" Talk from a Prosperous Self-made Smith to his Former Apprentice, now in Business.

Dear Jim:

Your letter got here just a little ahead of one from Sam Stokes. I hadn't had much time to feel real good about the glad news in your letter when Sam's comes along like a pail of ice-cold water. I was mighty glad to know that you got, or rather charged, good prices but was blamed sorry to have Sam tell me that you didn't get all of the price you charged. Funny I should hear about little things like this way off here.

But, Jim, it isn't a little thing. Graft isn't a small thing and that's the only name I know that expresses it. You might call it bribery, but that doesn't sound nice either. When a man brings work to your shop to get a ten or fifteen per cent rake-off, how can you have much confidence in your work? If a man brings work to your place for any other reason than a pure, honest business reason, you certainly cannot respect your work as you would if he came for a business reason.

Business done on the ten per cent rake-off principle isn't business at all. It's graft, or bribery; both mean the same thing. And while you may at first give your customer full value for his money and good honest work, you'll begin to think after awhile that you may as well skin the job here and there and get a fair profit. Finally you'll find yourself doing things that are really dishonest and when the crash comes, as it always does, you'll find yourself down and out.

Another thing, this ten per cent rebate business, while some may not call it dishonesty, borders so closely to the outside edge of honesty that it's bad for a man's character. Graft warps and changes a man's character just as the small graft when inserted in a great tree changes the character of the sap that flows through it. The sap of a sour apple tree in the shoot of a sweet apple tree becomes sweet. While at first your actions in rebating may be honest and fair or as honest and fair as actions of this kind can be, yet gradually, step by step you will clip a little

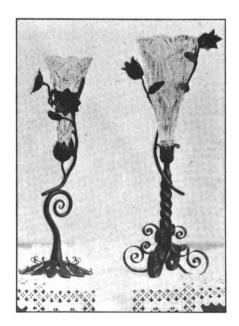


A GRILL FOR A SMALL WINDOW

here and snip a little there until you wake up to find yourself a full-fledged grafter.

And while on the subject just let me say that the political grafter doesn't always get his first taste of grafting in politics—he usually learns the art in business and then carries the practice into public office.

Don't try to defend your position by saying that you are simply trying to "stand in" with your customer's help. And then, too, it's a mighty poor cause that hasn't some defense. Even



TWO NEAT PIECES BY ROY G. WILSON OF NEW MEXICO

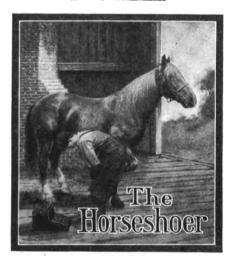
the "Good Book" has been quoted in defense of what was nothing but pure stealing. Dominie Plummet, down in our town, was one of these staid, oldschool ministers who was always quoting

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scripture and holding up his hands in horror. He went about with a face that reminded one of a coffin and a headstone. Whenever he went to the grocery he would wait for one of the boys to wait on him and when the boy was filling a measure with potatoes Plummet would throw four or five extra potatoes into his basket and say: "The Lord loveth a cheerful giver." This same proceeding would be followed with everything he purchased until one day the grocer caught him at it and told him in good plain English just what he thought of the Reverend Plummet. It's a pretty poor cause that hasn't some defense. It's not the defense that makes a certain action justifiable, it's the action itself.

There's lots of material for thought in this little letter—read carefully, think soundly and reason it out yourself. Yours for honest business,

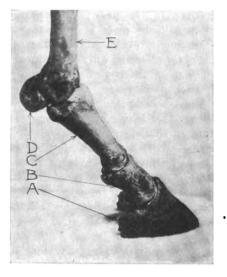




What the Shoer Can Do for Lame Horses.

E. H. MALOON.

My purpose in this article is to help in the shoeing of the horse that interferes in front; the troubles he is liable to and what the shoer can do to help him. To help him we must understand how he is made and put together. I don't think shoeing affects a horse much above his ankle. Hence, I will begin there and tell you as best I can how the leg and foot look to me. I obtained my knowledge from good books and charts and from a horse's leg cut off at the knee. I removed the skin with a knife and found what the book said was true. In this way I made myself familiar with the subject. I then boiled these bones out in water and kept them. When I talk horse



BONES OF THE HORSE'S FOOT. A, COFFIN BONE; B, SHORT PASTERN; C, LONG PASTERN; D, SESAMOID BONES; E, CANON BONE.

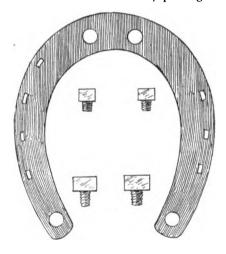
to a man I can show him what I am trying to tell him. The ankle joint is the union of the canon and long pastern bones. These joints have two small bones back of them, called sesamoids. The next joint downward is the coronary joint, which joins the long and short pastern bones. Next the navicular joint joining the short pastern, coffin and navicular bones. This navicular bone is a small bone under and back of the navicular joint. The coffin bone is a circular bone the shape of the hoof on the outside shell. This is the last bone in the foot.

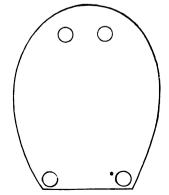
Now, as we speak of the different causes for lameness, we will describe the different parts as they come into view. There are two cords running down the back of the leg; one down over the ankle joint partly joined to the lower end of the coronary bone outside of the navicular joint and bone and is fastened to the bottom of the coffin bone. This cord flexes the foot. The other cord is at the rear of the leg. follows the same course and is fastened to the ankle joint. This cord moves the ankle joint. When a horse is shod with calks and no base on his shoes these cords have to support undue weight and they become sore and inflamed, and the horse goes lame. Now, to get him out of this trouble, I lower his foot as low as possible on the bottom, make a shoe with a good wide bar and with calks. I raise his heels a little higher than natural, thus releasing the strain on the cords. The owner must reduce the soreness as best he can after you have removed the cause and done your part.

This condition is often brought about

by low heels and a long, high toe. Right here, I will say, my way of paring the foot is to remove all the hoof from the bottom that can be done in safety. The horse does not need a great surplus of hoof to carry around. In doing this I let the sole alone and simply pare a flat surface, giving a good wide bearing to the shoe and lowering the heel as well as the toe. A high heel is never a strong heel. Pare level, having both sides look alike from the coronary band down and as much hoof on one side of the frog as on the other. Your eye must tell you when you have lowered the toe so as to keep the lines of his leg right, as the angle differs in different horses. The cord that runs down the front of the foot holds the toe up as the foot moves forward. This cord often becomes weak and does not hold the foot up and we have a horse that stumbles and wears his toes unduly.

This is only one cause of stumbling. My remedy for this is to roll the toe of the shoe, if a flat shoe is used. If a calked shoe is used I give him a square-toed shoe, beginning at the toe nails and making his shoe straight across from toe nail to toe nail, putting on

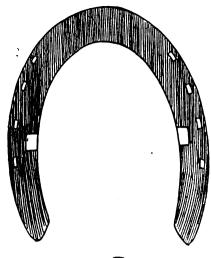


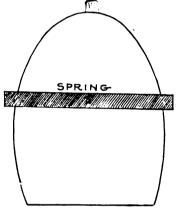


MR. WENKE'S SHOE FOR FRONT FEET

a long, low calk. In setting this shoe on I endeavor to carry the toe of the shoe so the horse will break over the

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MR. WENKE'S SHOE FOR HIND FEET

shoe in the center of the calk, as lots of horses fall that break over the toe calk on the outside corner.

That Humane Shoe and Nervous Mules.

FRANZ WENKE.

The October American Blacksmith has arrived with its very interesting pages: I have just read the article by Mr. W. Lindsey on his Lindsey Humane Shoe. Now, Brother Lindsey, where have you been these last thirty years? As long as I can remember, I have seen and used this shoe for about thirty-two years, and have, I believe, described it in The American Blacksmith in the April number of 1907. Where this shoe originated I don't know, but I believe I first saw it at the Veterinary College in Dresden, Germany. Dr. Lungwitz in his text book on horseshoeing describes that shoe and I believe it is his invention, as he is a professor in the above named college.

By the way, the plate Brother Lindsey puts under the shoe can be much improved by dishing it some, as in the shape of a soup plate. It will then, if packed with oakum, give a very good bearing for drop sole. In some cases where a wet pack is required the

moisture in the pack will be longer retained if the plate is hollowed out, as the moisture will gather in the bottom of the plate and will not be squeezed out, but on the contrary will moisten the pack at every step.

About shoeing that nervous mule, I will say that I have had to shoe a good many of that disposition. Generally I handle such fellows with a switch and a rope. Only once or twice have I had to throw a mule. I would not run the risk of having a few ribs cracked or a leg broken for the pittance a horse-shoer gets for his work. No, not for anybody, not even for my Uncle Sam, for whom I am working at present and who pays me full wages while being laid up for repairs.

A Pair of Self-Adjusting Tongs. R. A. LEWIS.

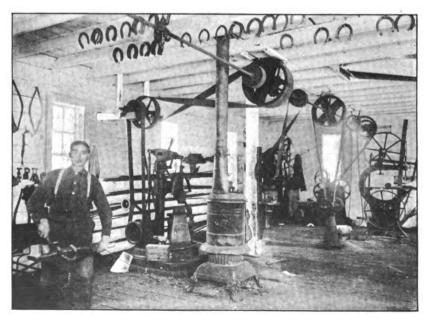
These tongs, as shown in the engraving, will readily adjust themselves to any-sized stock within their range. As shown, the lower jaw, instead of being of one piece as in the regular tongs, is made up of two pieces. The part which touches the work is hinged in its center between a forked jaw. This arrangement allows the two jaws to be parallel at all times, which is necessary in order to have a perfect gripping tongs. At B is shown the bottom view of the bottom jaw, while at C is shown how this style of tongs will adjust themselves to a large, heavy piece of stock. These tongs are easily made, or can be easily fashioned, from an old pair of regularstyle tongs. The rivet, or bolt, used in hinging the movable part of the lower jaw to the forked part must, of course, be heavy enough to stand the strain

likely to be brought upon it. This hinged piece should also work very freely, in fact, it should be quite loose so as not to bind when hot.

Piece Work in the Large Shop. T. J. M'CANN.

Piece work is coming more and more into general use each year, and I believe it is to the foreman's own interest to make himself familiar with the subject It has often been said that piece work can be easily run in a manufacturing plant turning out new work, but that it is impossible in a repair shop, especially a small one. While jobs come into the shop almost every day that never have been in before, and probably never will be in again for a long time at least, yet most of the work is the same day after day, and this can be priced. It can be worked piece work if the foreman will intelligently classify his work. Say, have one man on frame work, one or two for brake rigging, another for tank work, etc. Strict discipline is also necessary. In a shop where piece work is in operation the foreman can make himself of greater value to his company, he need no longer use his time watching and driving his men. When the whistle blows the man who has the piece work is ready to start and he will stick to it until quitting time. The foreman can forget about that fellow and can confine his time to distributing the work to the best advantage, and to the inspecting of it when finished.

Piece work is also better for the men. The man who works faithfully all day will make from three to five dollars a



THE POWER CORNER OF MR. C. G. BILD'S SHOP OF IOWA

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day while the "soldier" shows himself up right at the start, and gets paid only for what he does.

Naturally, the fixing of prices is the most important part of a piece work system, and determines whether it shall be a success or a failure. It is only reasonable to expect a fair day's work for a fair day's pay, so if the time it takes a man working faithfully to complete a job is the basis on which the price is set there can be no objection from the men who are paid that price. Some men working as fast as they are able may earn five or even six dollars a day, but the work is there to show for every dollar. Loafing does not go. The fan has not been run any longer, not much more coal has been burned and the over-head charges are the same, while the output of the shop has been increased. It has been my experience that piece work works greatly to the advantage of the men, the foreman and the company.



"The apprentice problem has been receiving considerable attention lately" said Benton, folding up his paper and turning to the Editor. "I see that the trade associations are considering the problem very seriously."

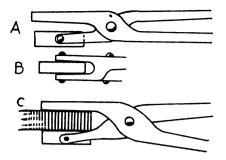
"Yes, it's a serious problem" put in the Editor," and it's getting more serious every day.'

"What, in your opinion, is at the bottom of the matter?" questioned Benton.

"Well, I think clean hands are in a great measure responsible for the lack of apprentices in the smithing trades."

"Clean hands" echoed Benton. "How do you figure that clean hands have anything to do with apprentices in the smithing trade?"

"The young man of today seems to think that to be respectable, to be a man of account, requires a new suit, a white collar and clean hands. He is afraid to soil his hands and naturally the ambition to keep one's hands clean does not work



A PAIR OF SELF-ADJUSTING TONGS

out to advantage in a smith shop." And the Editor gave a few instances of where the ambition to appear well-dressed kept men in low-paying positions. "Take the man behind the counter of the department store, for instance," continued the Editor. "You go in to buy a tie or a pair of socks or some ribbon for your wife. The man that waits on you looks as if he just stepped out of the pages of a style book. His suit is pressed, his collar's white and his hands are clean. If you watch him Saturday night you'll see him count eight or possibly ten dollars out of his salary envelope. If you call at the men's furnishing store or the clothing house you'll find some more young men with fashion-plate clothes and clean hands, who count as far as eight or ten on Saturday night. Clean hands are costing them the difference between their Saturday-night allowance and the three and four dollars a day that the roughly-dressed, dirty-faced young fellow whom you find carrying a grub pail, gets. And the chances for better wages and better positions lie with the dirty-faced chap."
"Do you think it all the young man's

fault?" questioned Benton.

"Yes, it is the young man's fault," returned the Editor. "Of course, if a father or mother thinks Handsome Harry too good for a dirty job even though the boy may have a liking for mechanics it's not the boy's fault. But it is the boy's fault to continue in the wrong channel when he knows that he's better fitted by nature to handle hard metal than to finger soft

"You advertise a job offering clean hands and you'll be overwhelmed with applicants when a dirty job will go begging. An example of recent occurrence comes to mind. The grocer who supplies us with eatables hired a bright young chap of about eighteen. The boy was active and a hustler and, therefore, his invariable practice of putting on a pair of gloves every time he measured an order of potatoes was overlooked. His salary was raised twice in four months, yet at the end of that time he accepted a job where he could have clean hands without the aid of gloves. The desire to have clean hands and to appear well-dressed costs that fellow just four dollars a month. That's the difference in what he was getting as a grocer and what he is getting as a clerk at a collar and tie counter, with the chance of betterment in position and salary all in favor of the grocery."

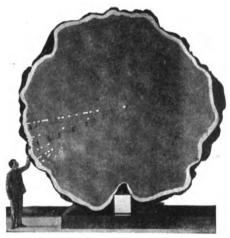
"It doesn't seem as though a man could be so short sighted" put in Benton. "I've never thought of the matter that way, but I guess you've got it figured about correct."

"It's so just the same" returned the Editor. "Take the girl clerk for instance, the one in the big store about whom your wife complains of being anything butpolite and accommodating—she receives five, perhaps six, dollars for a week's services. If you take a walk along some back street and stroll into a factory you will find girls with nimble fingers that earn from twelve to eighteen dollars a week on piece work. And yet the average person gives a toss of the head and a shrug of the shoulders when you mention that so-and-so works at the factory."

"What do you think is the remedy?" questioned Benton. "There must certainly be some solution to the problem of

lack of apprentices."

"The solution is the technical high school, the trade school, the school of manual training and the courses in horseshoeing and farriery at the agricultural colleges," replied the Editor. "These institutions can raise the trades to where the fellows with clean hands will enlist. But it can't be done in a day or a month or a year. It will take time to change the clean-hand idea of respectability to the idea that he who works with mind and hand, irrespective of the condition of the hands, is the builder of the nation. The development of the



BEGAN GROWING IN 550 A. D.

This is a cross section of a gigantic redwood tree which was 350 feet high and 90 feet in circumference at the base. Counting the number of annular rings shows that the tree began growth in the year 550. Fig. 3 shows its size in 900; Fig. 6, in 1492, and Fig. 9 in 1891.

mind alone, leaving the natural instinct of the hands for occupation shift for itself, has seen its best day. Educators everywhere are coming round to the idea that the child is not getting the proper education when reading, writing, arithmetic and the like are the only subjects taught in the schools. It means the development of the mind without any attention to useful arts or occupations. The day is not so very far distant when you will find the young people learning how to make a kitchen table or to use a rolling pin instead of how to read the stars, when to forge an iron gate for the front yard will be considered of more importance than to be able to read ancient Greek or Latin. Yes. Benton, the technical school will sound the doom of the clean-hands idea.

And with an air of finality the Editor turned his attention to a pile of photographs marked "January."

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While the Christmas Log is Burning.

ELIZA COOK.

Hail to the night when we gather once more All the forms we love to meet; When we've many a guest that's dear to our breast,

And the household dog at our feet.
Who would not be in the circle of glee
When heart to heart is yearning;
When joy breathes out in the laughing

While the Christmas log is burning?

'Tis one of the fairy hours of life,
When the world seems all of light;
For the thought of woe, or the name of
a foe.

Ne'er darkens the festive night.
When bursting mirth rings round the hearth,
Oh! where is the spirit that's mourning,
While merry bells chime with the carol
rhyme,

And the Christmas log is burning?

Then is the time when the gray old man Leaps back to the days of youth;
When brows and eyes bear no disguise,
But blush and gleam with truth.
Oh! then is the time when the soul exults,
And seems right heavenward turning;
While we love and bless the hand we press,
While the Christmas log is burning.



A good man to watch is the man who always agrees with you.

Then, too, a shopful of cheerful workmen keeps the customers full of cheer.

Queer that the smith when on strike doesn't strike, but when working strikes.

'Tis mighty good to advertise, but see that what you advertise is mighty good.

Except when you're supposed to be doing something else, sleep is a mighty fine thing.

"I have a place for everything' said Tom Tardy, "but the trouble is to find the place."

Leave the blow and bluster for the bellows and blower—let your motto be "a smile for everyone."

'Tis the man who, Tom-Tardy like, thinks tomorrow plenty of time who is generally caught napping.

Success means getting ahead, but if to succeed one must get "a head" 'twere better not to succeed. The only man who really knows how is the man who does things. All the others only think they know.

Just so long as you improve mentally, spiritually, physically, just so long will your life be worth while.

Both are acceptable for the auto department. Short items and also long articles are welcomed by the Editors.

It depends upon the smith whether smithing is worth while. Surely there is nothing the matter with the good old craft itself.

The smith who devotes all of his time attending to his own business will find himself pretty busy and, some day, mighty successful.

Judge Lindsey says "The best time to handle a man is when he is a boy.'' The best time to handle a helper is when he's the shop kid.

Tomorrow, by some smiths, seems to be the day for doing things—yesterday is mentioned by the "has-been." But today is the only time worth while.

An aerial torpedo has been invented by a Swedish artillery man, which it is stated can be fired without noise or recoil. It is especially for fighting airships.

Get your order in now if you haven't yet reserved a supply of calendars. Somebody will surely be disappointed, but we don't want you to be that somebody.

You can't get business unless you're full of business. Be bursting and bubbling over with business every business day—it will draw business as a magnet draws steel

"Our rule" says Thornton, "is to make the job so good, to put such quality into it that the customers will forget all about the price long before the job again comes into the shop."

A dredge for work on the river Mersey and now building in England will have a hopper capacity of 180,000 cubic feet and is expected to lift ten thousand tons of sand in fifty minutes.

Since 1848, the year gold was discovered in Eldorado County, California has produced \$1,452,785,767 worth of the yellow metal. The record year was 1852 when \$81,294,700 worth was the output.

John Hogan says "Yes, I am achargin' you a good price, but ain't I a-givin' you good work?''

Vacuum machines have been used for some time for cleaning housefurnishings, but now we have such a machine for the cleaning of horses. 'Tis said that an animal can be cleaned thoroughly in less than five minutes.

When tempted to "skin" any job—DON'T. Do it the best you know how. Give twelve inches to the foot and charge a fair price. A mutual understanding on this platform and the craft would be ideal. Why not strive for this goal?

"The Fairfield Enterprise" is the name of the bright little newspaper published by Brother J. M. Fix, whom many of "Our Folks' will remember as a frequent contributor to "Our Journal." Mr. Fix is still interested in his smith shop.

Why will a smith pay a pedler five dollars for some brazing powder with a fancy name and made of poor borax and spelter when by spending a dollar for twelve months of The American Blacksmith he could learn how to make a good brazing compound for about thirty cents a bushel?

\$2,856,000 has been paid by a German firm for the right to manufacture bottles with an American machine. The Germans had been using a machine which could produce 1,500 to 2,000 bottles a day. With the American machine they will be able to turn out 15,000 bottles a day.

"My side line" says a Washington state smith, "is a Sunday School which was organized in my shop in August. We will continue to meet here until a more suitable place can be afforded. There is no other place available now so we just have Sunday School in the shop and use the Trenton anvil for a bell."

A unique watch exhibited at the Franco-British Exhibition and said to have cost nearly \$5,000, has a front and rear dial and strikes the hours, halves and quarters. It shows the risings and settings of the sun and moon, keeps account of the tides, designates equation of time and Greenwich mean time. It automatically adjusts itself to show the day and month and indicates astronomical events.

When the fodder's in the silo,
And the oats are in the bin;
When the farmer sits and chuckles
As he sees the corn roll in,
Then it's time to dust the ledger,
Figure up his whole account;
Hit him quick, while he is laughing,
For he'll pay the full amount.

A top buggy built in less than three hours was the extraordinary stunt of an Australian firm at a reception in their carriage works to some 2,000 people. The men set to work at seven o'clock in the evening with raw material, and for two hours and forty-eight minutes forges roared, machinery whirred and the entire factory hummed and buzzed with activity. At the end of that time the buggy was complete and the horse harnessed in. The painting could not, of course, be attempted.

A new system of welding has recently been invented in England by means of which it is possible to weld high-speed steels onto other steels. The operation is performed by means of a thin film of copper. The copper is placed in the form of a feeder along the line of the joint. The parts to be welded are then surrounded by a reducing compound and placed in a furnace where the temperature is raised to about 2,200 degrees fahrenheit. The gas formed by the burning of the compound causes the copper to be reduced to a thin watery fluid and to thus penetrate the molecular of the two steels and to produce a weld stronger than the remainder of the metal. According to engineering the weld is so close as to be practically undistinguishable. A wide field of usefulness is predicted for the process. One application will most likely be that of welding high-speed steel to carbon or machine steel bodies for the production of high-speed cutting tools at a moderate

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Association Notes.

The smiths of Durham, Greene County, New York, have an agreed price list. They have formed a union of blacksmiths to recommend the prices of shoeing and other work. They have agreed to charge the following prices:

Shoeing up to No. 5, \$1.40 per set; No. 5 and 6, \$1.50; No. 7, \$1.75; new bar shoes, light, \$1.20; heavy calked, \$1.50; setting and fitting, 50 cents; calking, 75 cents; calking bar shoes, 25 cents; Neverslip up to fives, \$2.00; fives and larger, \$2.50; setting Neverslips, 60 cents; new calks and put in 5 cents each; setting tire, 50 cents per wheel; new tire 7 by 36, \$5.00 per set; new tire including 13 by 3, \$4.00 per set, cost of tire added; 13 by \$, \$5.00 per set; 13 by 3, \$6.00 per set; 2 by 3, \$6.00 per set, cost of tire added; felloeing wheels 11 and smaller, \$6.00 per set; 13 and 11, \$7.00; larger \$8.00; spokes up to 11, 20 cents each; 11 up to 2 inches, 25 cents each; shafts, \$1.50 each; cross bar 75 cents.

American Association of Blacksmiths and Horseshoers.

Rome was not built in a day. We do not expect to overcome, in one day, one week, or one month, conditions that have existed for years. Patient, persistent effort is necessary to bring complete success. We do not expect every man in a given county to join the association at the first meeting. But we do expect to keep hammering on this association and organization problem until we have the entire country solidly organized. And the sooner you, Mr. Reader, send for my easy plans for organizing branch associations the earlier we will be able to start movements of a national character.

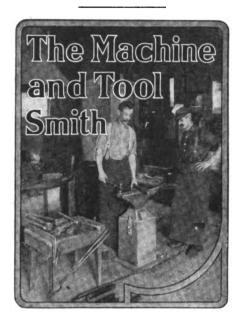
If you haven't the advantages of an organization right now, get busy, get the men of your locality, send for my easy plans and then keep things moving. Every smith knows what he should get for his work. Every smith knows that he seldom gets what he should get. Think what a slight increase on every job you do would mean. Think of the comforts you could have and your family could have if you got the prices you ought to get. Think of the money you lose every year on bad accounts. Think of what you could do with this money that really belongs to you but which you never get.

Isn't the effort worth the while? Isn't it worth the effort to get the prices you deserve? Isn't it worth the effort to get the money for work you have done? Isn't it worth the effort when we will help you make the effort?

You can do what hundreds of other smiths have done and are doing for themselves and the craft. Drop a postal to P. O. Box 974, Buffalo, N. Y., and by return mail you will get my easy plans. They cost you nothing and you will get my help in your efforts to form a branch association in your county.

Stop right now to write that postal—it will take you just about a minute, will cost you one cent and will mean better trade conditions for you.

THE SECRETARY.



For drilling tempered steel try a solution of chloroform and camphor. O. E. S., Mass.

The secret of success, if it may be called a secret, in tool-steel work is careful heating. Proper heating of poor steel will give better results than careless or improper heating of good steel. It's not so much the steel as it is the handling. You may have the very finest steel in the world, yet careless handling will ruin it and make it worse than no steel. O'STEEL, Maryland.

Casehardening: The Box, the Furnace, the Material.

The first requisite to good work in casehardening any material is the box in which the articles to be casehardened are packed. If a flat-bottom box is used the contents throughout cannot

formly around every side of such a box. Fig. 1 shows a properly constructed box and is the only kind that should be used if satisfactory work is to be turned out. To allow the heat to circulate freely under the box a heavy rib about one inch high runs along each side of the bottom. Three bosses arranged as at A on each side provide a strong support for the handling tongs, the jaws of which pass on each side of the box as at C. A good, perfect-fitting lid should be provided for each box and after the box is packed and the lid put on the joint should be well luted, as at B, with thick asbestos paste or cement. Boxes of this kind may be made of practically any size to suit the work to be done. Two rows of boxes varying in size from five by five by five inches to about six by eight by sixteen inches are shown in Fig. 2; then there are, of course, special-sized boxes for use on special work. We cannot have too great a variety of sizes for casehardening in an automobile factory of importance. The boxes and covers shown in Fig. 2 are cast iron and are perhaps the best and cheapest kind of box to use. After they have been placed in the furnace a few times they become malleable and can be kept in shape with the hammer.

The next item of equipment required in a casehardening shop is a good furnace for carbonizing. There are many so-called experts who think that about anything will answer in the way of a furnace. Just let us consider the style of furnace actually used by a large manufacturing concern. Fig. 3 shows a cross section of this furnace. This firm uses large flat-bottomed boxes and packs all work, large or small, in the same boxes. For instance, pieces that should be carbonized onesixteenth of an inch are packed in the same box with pieces that require a depth of one-thirty-second of an inch.

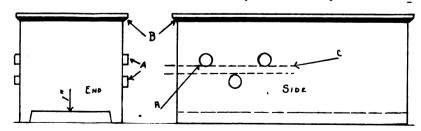


FIG. 1. - A PROPERLY CONSTRUCTED BOX FOR CASEHARDENING

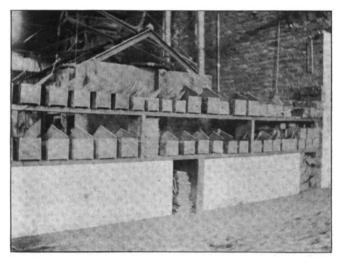
be brought to the same degree of hardness. The reader can easily understand how it would be impossible for the heat to circulate equally and uniThe burner enters the furnace at A and is presumably supposed to throw a flame along this channel. How anyone can expect to get a uniform heat

in this furnace is beyond understanding. The side of the boxes marked C will no doubt get hot enough, perhaps too hot, but what of the other sides and the bottom?

At Fig. 4 is shown a carbonizing furnace built on the proper lines. The

iron arranged so as to have cold water come in at the bottom of the tank with an overflow at C. After setting up your tank, arrange a platform at D with an incline E from the platform to the edge of the water tank. This incline should be made of \(\frac{3}{4}\)-inch rods,

not use any material at all. Imagine, for instance, if you can, a man packing parts to be carbonized and placing them in the furnace in boxes without covers. How anyone can expect good results from this practice is beyond understanding. It is the gases genera-



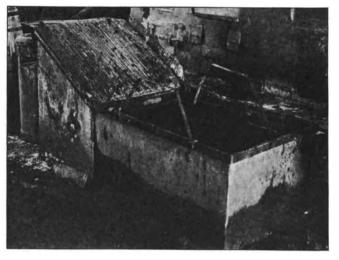


FIG. 2.—AN ASSORTMENT OF CASEHARDENING BOXES

FIG. 5.—THE CORRECT STYLE OF QUENCHING TANK

boxes A are placed on large tiles supported by brick pillars. The heat and the gas from the fire box B is forced by the draft over the brick wall and into the furnace or oven at C, where it circulates among the boxes and finally passes down through four openings, one in each corner of the furnace, into the flues D. D. By using boxes with bottom ribs, uniform heat is insured. The pyrometer of this furnace should be attached at X on the back furnace wall and about three inches from the floor. This style of furnace can be obtained ready made from Brown and Sharpe, or may be built by the mechanic.

as shown, running lengthwise. Do not use wire mesh as the cross wires are liable to catch and hold small parts. The use of straight rods eliminates this tendency. When the carbonizing boxes are to be dumped they are placed on the platform B, the cover removed and the contents allowed to slide down over the rods E and into the water. The incline thus removes all carbonizing material from the face of the articles and they enter the water free and clean, thus insuring a very uni-

form degree of hardness on all parts of their surface. ted by the heat acting upon the carbonizing material that produces the results which we are after when we carbonize metal. If these gases are allowed to escape, we cannot, of course, expect good results. Another very careless way of doing work is to remove the box from the furnace and dump its entire contents into the same tank or barrel, picking out the parts that are supposed to be carbonized and later throwing the mixture or carbonizing material onto the refuse heap.

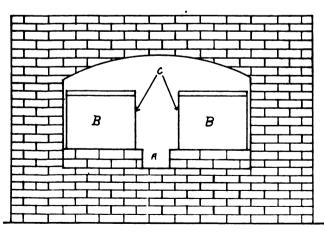


FIG. 3.—SECTIONAL VIEW OF A FAULTY FURNACE

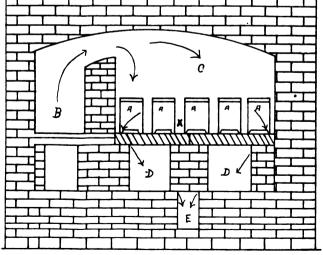


FIG. 4.—SECTIONAL VIEW OF THE CORRECT STYLE

In Figs. 5 and 6 are shown a photograph and also a draft of the correct style of quenching tank. A strong water-proof tank B is made of wrought

Of course, our result depends in great part upon the carbonizing material used, but if the method in using a material is not right we may as well In cooling work in this manner it is simply impossible to have the water touch all the parts equally and uniformly, and a uniform degree of hardness



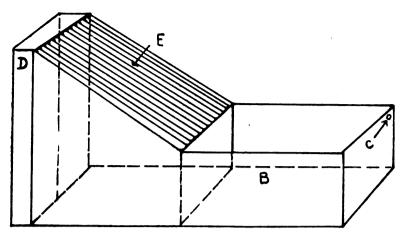
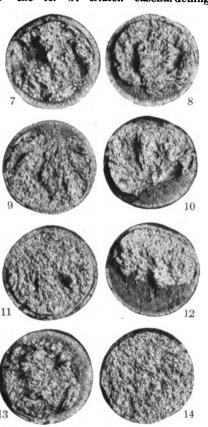


FIG. 6.—THE QUENCHING TANK IS EASILY CONSTRUCTED

cannot, of course, be had. The practice of packing all kinds of parts, large or small, in a large box has already been mentioned, and is a practice which should not be tolerated.

Some hardeners assert that it is necessary to leave boxes in the furnace for forty-eight hours at a heat of perhaps 1650° F. If we place a piece of high carbon tool steel in a furnace for forty-eight hours at that degree of heat will it be hard when quenched in cold water? Try it and see for yourself or, what is easier, take a piece of stub steel or drill rod and heat it in your forge fire. You will find that in order to obtain a good, hard job you will have to dip it before you get it very hot. If you don't the piece will be quite soft. You can easily test the pieces with a new file. By experiment I have found that the carbon of any carbonizing material has spent itself in a good deal less than twentyfour hours at a heat of 1500° F. If parts are packed in a box, allowed to remain in the furnace for fourteen hours and then cooled you will find that they are carbonized just as deep as they would be if left for twentyfour or even forty-eight hours. I fail to see the advantage of leaving them in so long. It would be far better to repack after they have been run for fourteen hours, simply placing them in another box with new material while the parts are red hot. Then they may be run for another twelve or fourteen hours. There is, however, nothing in automobile parts which requires a depth of more than one thirty-second of an inch and this can be easily obtained in twelve hours with bone black or raw bone and charcoal mixed. There is nothing that quite equals charred leather with this class of casehardening, but until lately it was impossible to obtain this material in sufficient quantities for dependency. Another very excellent material used by the writer is the A. O. Blaich casehardening



ALL PIECES ARE FROM ONE BAR

material. This acts very quickly and gives a very fine case and leaves a

tougher interior than anything we have ever tried. Then again, it is lighter than bone black, being used in the dry state and not soaked in oil. It weighs about one-third that of bone black. Another advantage of this material is that its fine texture enables you to pack it thoroughly into small openings and into intricate forgings. We have used this material as much as three times on parts that required but a thin case. When packing the box do not have any parts touch each other or the sides of the box, and see that the box is solidly full. Carefully lute the cover on and place the box in the furnace at about 1500° F. for about four or five hours, according to the depth of hardness you require.

The results of a number of experiments with various casehardening materials is shown in the several engravings. One-inch round steel was used and all of these pieces are from the same bar: Fig. 7 shows a piece that was packed in the A. O. Blaich casehardening material and placed in the furnace for six hours at a heat of 1500° F., and has, as can be seen, about five thirty-seconds of an inch penetration with a very soft interior. This piece was subjected to a strain of 27,000 pounds before breaking and is perhaps the best specimen of carbonizing that the writer has ever seen. Fig. 8 was given the same treatment in bone black. The penetration is not so deep as in Fig. 7, the grain is much coarser while the interior is more brittle. This piece broke under a strain of 23,190 pounds in the testing machine and is by no means as good a job of carbonizing as the specimen shown in Fig. 7. As an example of what can be done in a short time with the Blaich material the piece shown in Fig. 9 was placed in the furnace but four hours at 1500° F. The piece shows a penetration of one thirty-second of an inch, the grain is very fine and the breaking test was 27,300. This shows plainly that the longer the steel remains in the furnace the poorer the job. Fig. 10 was treated

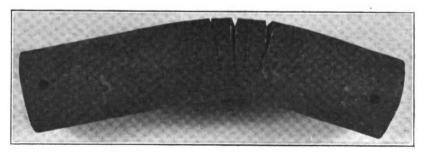


FIG. 15-AN EXAMPLE OF EXCEPTIONALLY GOOD CASEHARDENING.

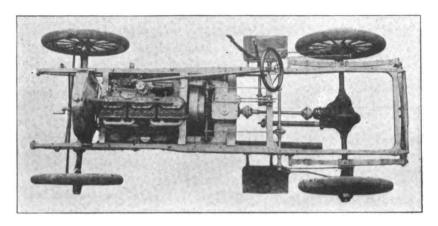


FIG. 1-TOP VIEW OF MORA RACYTYPE CHASSIS

the same as Fig. 9, except that bone black was used. The steel came out comparatively soft, breaking under a strain of 21,000 pounds. It looks like a poor piece of low carbon steel. For automobile work there is little call for anything better than the specimen shown in Fig. 9. This will allow the hardener two dumps every ten hours and means a decided saving over the foolish practice of running boxes for 12, 14, 24 or 48 hours at a time. In. Fig. 11 we have a piece of steel which was packed in Blaich material and run in the furnace for twenty-four hours at 1500° F. The case on this piece is not so good as that shown in Fig. 7 and in the test it broke under a strain of 23,275 pounds. Fig. 12 shows a piece treated in the same manner with bone black and is a very poor job. It has a very uneven case and looks as though it were hardened nearly half way through on one side and about one thirty-second of an inch on the other. This is no doubt owing to the oily substance of which bone black is composed. This piece broke under a strain of 20,000 pounds. In an effort to determine just what forty-eight hours in the furnace would give us the piece shown in Fig. 13 was packed in the Blaich material and has a hardened case of three-sixteenths of an inch. This piece broke under a strain of 23,000 pounds, showing us that the longer we allow the pieces to remain in the furnace the weaker the metal, to say nothing of the loss of time. Fig. 14 shows a piece packed in bone black and allowed to remain in the furnace for forty-eight hours. This broke under a strain of 16,000 pounds and looks very much like a piece of cast iron with very little hardened case. As an example of a first-class job of casehardening the engraving in Fig. 15 is presented. This piece was packed in Blaich material that had been used once before. The

box was left in the furnace for five hours at a heat of 1500 degrees and after a strain of 25,000 pounds was put on it, it came out of the testing machine as shown. This is an ideal job of case-hardening and shows a piece of steel with a very hard case and at the same time an extremely tough interior. This is just what is wanted for automobile and lots of other work.

Forging and Hardening Highspeed Steels.

F. F. HOEFFLE.

When forging high-speed steel into shape care should be observed in the manner of heating. The steel should

the steel becomes too cold it will be necessary to reheat to a high temperature and then forge to a finish. When completed it is essential that the tool be laid down in some dry place to cool.

When the tool has become cold reheat the cutting part to a snow-white heat. The cutting point of the tool should then be made quite cold by blowing fan blast or dry compressed air, care being exercised that only the cutting part comes in contact with the air. Make it a point always to have a good clean fire; a small coke furnace adapted for this work will give the best results for heating.

To obtain good results from the annealed steel, first remember the annealed steel should not be heated until placed in condition for hardening. To anneal this steel it is good practice to use an iron box sufficiently large to fully accommodate the steel. Place the steel in the box and cover it well with fine iron turnings, or still better, cover with hammer scale. Next place in a furnace and heat slowly to a good high red heat. Let it remain in the furnace all of twelve hours to cool. This process of annealing will assure a good soft steel for cutters, reamers and drills. It will be found that steel annealed for tools of this kind can be

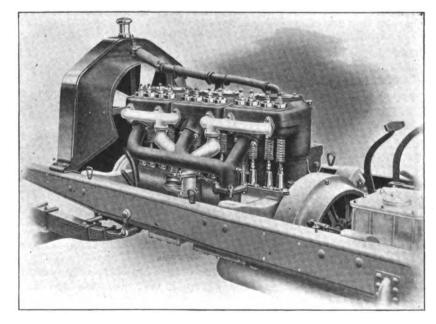


FIG. 2-SHOWING LEFT SIDE OF THE MORA MOTOR

be allowed to heat slowly and it is necessary that the bar or the end of the piece that is being shaped should be heated to a good high heat, and then forged while good and hot. It must not be hammered when red hot because the steel will burst and crack if forged at too low a heat. In case

worked, drilled and milled into shape equally as well as any carbon steel, the steel being nice and soft.

These tools, when finished, must be heated in a clean fire or a coke furnace and heated to the very highest point of heat necessary to give the results. Care should be taken not to destroy

the point of the tool by careless handling in the fire. After the tool has attained the proper heat immerse in fish oil. When it has cooled the tool, if it has received proper attention throughout, will be a good one. In case the tool should get too hard clean the oil off nicely and draw the temper to a straw color and cool off in oil again. Large tools can be cooled under a strong blast of compressed air, but in this case see that the air is dry and that there is no water in the air-pipe line.

The results that can be obtained largely depend on the firmness of the toolsmith in carrying out his convictions as he may understand the treating of this steel. Failures are made often by the toolsmith's allowing himself to be influenced thus and so, contrary to his own convictions, by men who do not understand steel and the law by which it is governed. Grinders of tools in the machine department have been known to make complaints against the toolsmith about tools being too soft, while upon investigation the machines for which the tools were made have decided in favor of the toolsmith. Criticism from a proper channel is an instrumental factor to promote good; but when from an improper source it is entirely out of order. Hence, the toolsmith must have the stability to carry out his convictions and not allow his better judgment to be impaired by a critic who does not know the laws governing the handling of steel. He should realize that his knowledge is acquired only by years of close observation and a strict application of knowledge gained by experience.

Performance of High-Speed Steel.

Turning steel engine and car p	er mi	nute
axles	34	ft.
Turning brass	80	"
Boring cast-iron car wheels		"
Boring holes in steel flue sheet		
for tubes	30	"
(75) ()))))		1

The feed should be governed according as the material is hard or soft.



The Mora Motor Car.

In Fig. 1 is shown a top view of the Mora six cylinder racytype chassis. It has two entirely independent systems of ignition, drop-frame construction, one hundred and five inch wheel base and develops from forty-two to fifty horsepower. The cylinders are cast in pairs as shown.

Fig. 2 shows the left side of the motor with all connections. The right side of the motor is shown in Fig. 3. The pedals shown at the left of Fig. 3 operate the clutch and the regular service brakes. The left-foot pedal operating the clutch. The emergency brake is operated by a side-hand lever,

and when applied releases the clutch. The gear shift is also by a side-hand lever.

These views will enable the automobile repairer to familiarize himself with the Mora car and to know something about the car and motor when called upon to repair or overhaul one in the shop.

Simply because a car is "a great big car" is no reason why the automobile repairer should be afraid to tackle it. The principles underlying all automobiles are practically the same. True, there are differences in details here and there, but if a man has successfully coped with a certain situation on a four-cylinder, the same situation on a six can also be successfully met. There are necessarily a greater number of parts to some sections of a six-cylinder car, but these need not necessarily cause the careful mechanic any trouble.

Adjusting, Repairing and Caring for an Automobile—2.

To adjust piston pin bearing, remove the side plates as above, turn the crank shaft over until the piston is in the most accessible position and the connecting rod out of the way of the hand; with a socket wrench tighten up the set screw in the upper end of the connecting rod. The bearing section and bronze bushing are split, and by tightening this set screw the ends are pinched together. Be careful to get a close fit and yet not make the bearing bind.

To remove the fly-wheel, unscrew the starting crank ratchet (it acts as a retaining nut) with a pipe wrench and take off

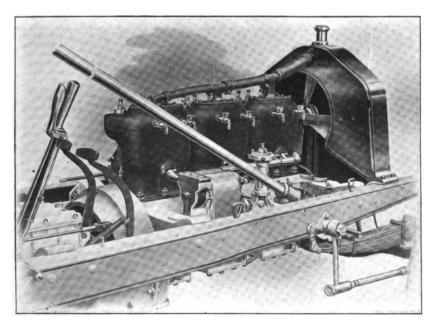


FIG. 3—SHOWING RIGHT SIDE OF THE MORA MOTOR

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the spark plugs being shown at XX, and from the magneto at Y. The battery connections being, of course, made at the dash end of the wire bar.

In this figure (Fig. 3) may be seen the radiator at R, the filling cap at F, and the flow pipe to the radiator

at P P. The steering post is seen at H H. The springs and stems of the inlet valves are shown at J J J J.

In Fig. 4 is shown the clutch which is of the internal expanding type. Fig. 5 shows the transmission with all gears. The case containing the trans-

mission gears is made of aluminum. The central part of the case holds the mechanism for clashing the reverse gear. The gears and pinions are meshed by means of worm and sector with a cam and rocker arm. The reverse gear cannot be thrown in without throwing out the other gears.



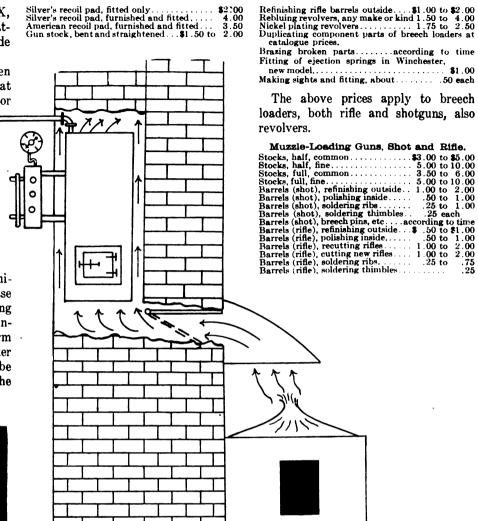
Gun and Novelty Repairing-3. w. A. MUMMA.*

Prices for Gun Work.

A gun and novelty worker should figure on at least fifty cents per hour, and on some kinds of work more. Some work will have to be charged for according to the time it takes to do it. If one does not have the proper tools to do the work and has to put up with makeshifts of tools he will waste too much time and get but little for his labor. Below will be given approximate prices which will serve as a basis:

Common stocks for breech loaders \$4.00 to \$5.0	w
Fancy stocks for breech loaders 8.00 to 15.0	Ю
Cheap stocks for small rifles, etc 1.00 to 2.0	Ю
Half stocks for muzzle loaders, about 5.0	ю
Full stocks for muzzle loaders, about 7.0	0
Fancy stocks for muzzle loaders, about 10.0	0
Gun stock refinished 1.00 to 2.0	0
Gun stock grip and fore end recheck-	
ered	0

^{*}Copyrighted 1908 by W. A. Mumma.



UTILIZING WASTE HEAT IN THE SMITH SHOP

Fore ends, complete fitted 4.00 to 6.00
Fore ends, irons only fitted 2.00 to 4.00
Case-hardening frames 1.00 to 5.00
New gun barrel fitted to gun actions, from \$2.00 up
Gun barrels both full choked \$3.00 to \$4.00
Gun barrels rebored and choked 3.00 to 4 00
Polish inside both barrels
Pits removed and polish both barrels 2,00 to 3.00
Barrels bored to cylinder bore 1.00 to 2.50
Bore out and choke both barrels 50 to 1.00
Swedge bulges to place 1.00 to 2.00
Raising dents, both barrels75 to 3.00
Chamber both barrels, any shell 1.00 to 2.00
Soldering loose ribs, up to
Bushing large shell chambers, up to 6.00
Browned, blued or blacked 1.50 to 5.00
Furnishing any kind of sights 1 .00 and up
Split butt stocks at butt plates re-
paired
Split fore ends repaired and finished 50 to 1.50
Rifling gun barrels, reboring 3.00 to 5.00
Riffing alone
Riffing alone. 3.00 Taking lodged bullets, wads, etc., out
of rifle barrels. 25 and up Cleaning rifles. \$ 50 to \$1.00
Cleaning rifles \$.50 to \$1.00
Cleaning shotguns 1.00 and up
Cleaning revolvers
New locks, front and back action,
New locks, front and back action, from
Locks, main spring furnished and
fitted
Locks, tumblers furnished and fitted 50 to 1.50 Locks, hammers furnished and fitted 50 to 2.00
Locks, nammers furnished and fitted . 50 to 2.00
Locks, screws
fitted\$.10 to \$.25
Locks, cleaning locks
Plungers and firing pin \$ 20 to \$.50
Triggers, right or left, furnished 35 to .75
Trigger guards and plates complete. 1 00 and up
Trigger guards alone, furnished and
fitted
Top lever springs
Locking bolts fitted
Locking bolts fitted
Locking bolts fitted

Barrels (rifle), breech pinsaccording to time
Barrels (rifle), tubes, all kinds \$.25 each
Fore end lips, shot or rifle50 to \$1.00
Triggers, double plate, shot or rifle 50 to 1.00
Triggers, single plate, shot or rifle25 to .50
Trigger guards, plate, shot or rifle
Silver or brass escutcheons, shot or
rifle
Iron or brass butt plates, shot or rifle .25 to .50
Locks, whole back or front 1.00 to 2.00
Locks, hammers fitted
Locks, tumbler fitted
Locks, repairing broken tumbler50 to 1.00
Locks, main spring
Locks, screws, small
Locks, screws, cross
Sights, solid
Elevating sights
Refinishing stocks, from50 to 1.00
Browning or bluing
Brazing according to time

Flobert Rifles and Other Cheap Guns.

Liopatr Killes and Omer Ch	eap Guns.
Stocks, new	\$1.00 to \$1.50
Stocks, refinishing	.25 to .50
Barrels, polishing, inside cleaning	.25 to .35
Barrels, polishing, outside cleaning.	.25 to .50
Barrels, taking out bullets, wads, etc	.20 each
Barrels, making sights and fitting	.35 to .50
Locks, hammers, all kinds	.50 to 1.00
Locks, main springs	.35 to .50
Locks, trigger springs	.15 to .25
Trigger, new, all kinds	.15 to .25
Trigger plate.	.15 to .20
Trigger guards	.25 to .50
Butt plates, iron or rubber	.10 to .25
Breech block.	1.00 to 1.50
Shell extractors	.50 to .75
Screws, all kinds	.05 to .20
Brazing and solderingacc	ording to time
Bluing and browning	
m 1 1 1	•

The work on bicycles, sewing machines, gasoline stoves, typewriters and all other light machine work, varies so

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much in character and variety that no definite prices could very well be given. The best way is to charge according to the time it takes to do the work. In connection with a gun and novelty shop one can keep ammunition supplies and all kinds of sporting goods, etc. Besides he can deal in bicycles and supplies.

(To be continued.)

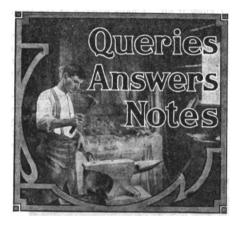
Utilizing Waste Heat in the Smith Shop.

D. FOSTER HALL

I was very much interested in the article by Mr. A. W. Lamplough, of Australia, on the utilization of waste heat in the blacksmith shop. It sometimes happens that two persons in different parts of the world will work along practically the same lines, their ideas differing only in detail. Each person in this case thought that the idea was original with him. I certainly thought so. Yet it is an old idea and one used for years. In large forge works, boilers seven feet in diameter and ten feet long are hung over the furnaces and the waste heat, passing through the flues of these boilers, generates steam to drive the hammers. It may possibly interest Friend Lamplough and others to have some details of the appliance originated by myself. The boiler in this case is an 18 by 36-inch tubular, hung in the brick work so there can not be much loss of heat, and located just back of forge chimney. The heat from the forge fire passes up through the fire box of the boiler through the flues and also around the outside of the boiler. It then enters the chimney at the top of the boiler. Wood, or any other fuel, can be used to heat the boiler. The gauge cocks and the glass water gauge are on the back side of the boiler housing, in easy reach of the blacksmith from the platform a little below bottom of boiler. A swing damper, located as shown by the dash and solid lines controls the heat from the forge fire. This damper can be dropped down when the boiler is not in use, thus sending the heat up the flue of the chimney. The damper is made of thick sheet iron riveted to a piece of 1-inch round iron, bent to form a lever for a weight to slide upon, so damper can be held in any position wanted. It can be opened full, or half, as wanted. With this device lots of heat can be saved to be used as wanted.

Advertising Your Shop.

Satisfied customers are the best advertisements—if they talk about you. But they seldom go out of their way to mention your name or business. You can make them your best advertisements and make them advertise you every day in the year by giving them a worth-keeping calendar, bearing your business card. THE AMERICAN BLACKSMITH calendar for 1909 is one your customers will be glad to hang in their stores, their offices, their homes. Advertising page 37 will tell you about advertising your shop—but you will need to act promptly.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

A Question on Rock Drills.—I would like to know of a method for dressing and tempering rock drills. Can some smith help me?

Philip Shimmin, Idaho.

To Temper Hardies and Springs.—Will some one please tell me through The American Blacksmith how to temper a hardie and a spring? M. Dwight, Texas.

Wants to Make an Axle Gauge.—Will some brother kindly explain the setting of an iron axle? I would also like to know a good plan for making a gauge for setting axles.

W. Chambers, Washington.

Wants to Build an Auto.—I would like to ask you where I can get the blue prints for building an auto in buggy style and what size engine I will want? About how much will it cost me to put one up for myself?

WILLIAM WINKIE, Wisconsin.

Licensing Horseshoers.—I would like to hear a little more about "Should Horseshoers be Licensed?" Let's make it go. It certainly would be a good thing for the horse, if for nobody else. What do you say, brother? C. C. RICHTER, Missouri.

Wants to Sharpen Skates.—I would like to ask through the columns of The American Blacksmith for some information in regard to making an emery stand for grinding skates. Will some brother smith who has had practical experience kindly supply me with the necessary information?

JNO. DONNELLY, Ontario.

An Interfering Animal.—Will some experienced brother smith tell me how to shoe a horse that interferes? Do you

lower the inside of the hoof or the outside? Also, does it make a difference whether the horse strikes with his heel calk or with the side of the hoof or shoe?

M. S. C., Washington.

To Temper Wood-cutter Knives.—We would like to have some brother smith inform us how to temper wood-working machine cutters so as to prevent water cracks.

Gould, Austrajia.

In Reply.—Your quenching bath is undoubtedly too cold. If you will warm the bath or will use an oil bath you will find your cutters will come out all right. Some hardeners assert that an oil bath at 100 degrees will give better results than if the bath is cold. It will certainly make your steel tough.

A. B. E., New York.

An Authority on The Trade.—I find THE AMERICAN BLACKSMITH a fine thing to refer to. I often show it to my customers for authority on horseshoeing, wagon work and some things that they cannot just understand, and I find that they invariably become much interested in it. I have my papers filed, so that they get to see a good many of them at once. They never fail to express the opinion that it is an up-todate paper and that a blacksmith ought to get many scientific pointers, and I never fail to tell them that I have worked at the trade over thirty years and in many places. but I think that the experience of many practical men is worth more than any one H. C. KUYKENDALL, California.

A Letter From Georgia.—I am a new subscriber and am simply carried away with your paper. I think it the best smith Journal I ever read. I was raised in the blacksmith shop and went to work striking for my father when I was ten years old.

I wish brother Brockway of Iowa could visit my little shop. I believe he would be a little easier on the country shop. While I have very little machinery, I am not opposed to it. I will tell you what I have. A No. 400 blower and also a blower of my own make. I have a Mole tire shrinker, a post drill, a turning lathe, an emery grinder, a grindstone, and a full set of Little Giant screw plates, which I think a pretty nice combination for a country shop, as one brother said, to run by elbow grease, but I don't run mine that way. I run mine by negro power. I have been shoeing, but had to abandon it on account of rheuma-D. J. STEOERY, Georgia.

The Length of Axles.-In the September number of The American Blacksmith Brother W. H. says we must make the hind axle longer than the front one or the wheels will not track if they set on a plumb spoke. Now, I fail to see the force of Brother W. H.'s argument for making the hind axle the longer. My idea of a plumb spoke is this: Place the wheels on the axle on a level floor. Take a carpenter's square and place the long part on the floor with the tongue of the square on the front of the spoke. If the spoke is in line with the tongue of the square it is plumb. Will Brother W. H. please tell me what the size of the wheel has to do with the wheel track? A. E. CARR, New York.

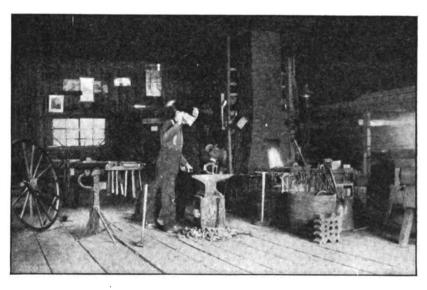
To Temper Dies.—In the October number J. F. V., North Dakota, wants to know how to temper dies. As he does not say what kind of dies I presume he means

screw-threading dies. If he can heat the die in such a manner as to keep the cutting teeth from becoming oxidized while heating he will have little difficulty. And after heating grasp the die with the tongs and quench in lukewarm water or brine by swinging the die back and forth. As, however, oxidization will render a tool useless, an excellent plan is to heat the die in an iron box which has about a halfinch of charred leather in the bottom. Also pack the opening in the die with charred leather. Now heat the box and all until the die reaches a uniform and correct temperature, when it is cooled as A. S. W., New York. before.

A Case of Seedy Toe.—Both Brother Hess of Iowa, in the October paper, and Brother Nelson, of New York, in November, have, no doubt, come across animals with seedy toes. If the outer wall has parted from the inner wall, that is the trouble and the only way to cure up the foot quickly and satisfactorily is to cut away all of the parted wall. Don't cut half or a quarter of it away, but cut every bit of it away that has parted from the foot. Now burn the edge of the remaining horn with a

and a few books I have done very well in a small way and in a small town. I would like for some brother to write me personally in regard to the best way for a young man to succeed in the work of practical shoeing. Charles T. Rodgers, Tennessee.

California Subscriber.—I frequently read in your journal about men, who have learned the trade in from one to five years. I don't think anyone can learn it in a life time. I commenced to learn the trade in 1843 at the age of fourteen, and in two years I ironed off a rockaway carriage, made the axles and springs, and every piece about it, and then I thought I knew it all. I have worked at the trade ever since I commenced to learn and I am still learning at the age of seventynine years. I find I know but very little about the trade. I am working alone. and THE AMERICAN BLACKSMITH is the best helper I ever had. Mr. Benton's article on page 83 is worth more than the price of the journal. I have been in the habit of cooling my brazed work, especially when putting a new thread in a vise box, but I do not doubt that his way is the G. W. BIGELOW, California. better.



INTERIOR OF MR. L. D. REARICK'S SHOP, PENNSYLVANIA

hot iron. Don't burn it too much, but touch your iron all along the edge only, to promote the growth of the horn. Now spread mutton tallow on the bared foot, bandage thoroughly and if possible let the horse run in a pasture for a while. Renew the bandage from time to time and a healthy foot will soon grow down.

J. L. ENGLISH, Illinois.

Wants to Learn to Shoe Horses.—I think "Our Journal" fine. I don't see how I could get along without it. I study it from first to last and enjoy all of it. I like to read Thornton's letters and think the hints he gives are fine. I would like to know through "Our Journal" how I can best learn to shoe horses correctly. I want to learn to shoe scientifically and I don't know whether to go to school or work under some one. I would like some advice from some of the brothers on the subject. I am a young man, started in the blacksmith business two years ago last March without any experience whatever and with the help of "Our Journal"

Tempering Hammers.—In answer to Mr. S. A. Flynt, who wants information on tempering hammers, I will give my method with which I have obtained the best results. I have made in the past three years somewhere in the neighborhood of fifty hammers of different styles and only two of them have broken. These I myself broke and the fault was poor steel. I forge my hammer with as low a heat as possible and in the finishing heat I use the flatter or swages and pack the steel all I can and then let it cool off. I then reheat to a dark cherry and cool in warm water. Then I do my grinding and heat to a medium cherry red and harden in warm water. I then polish the head and get an iron plate. This I lay over the fire and then heat with the hammer laying on top until it turns to a copper color. I guarantee that you will have as good a hammer as any you can buy from a fac-C. W. METCALF, Iowa.

On Setting Tires.—I have never written anything for Our Journal but I will try

and answer Brother H. H. Hays, of Texas. I see that he pitches onto Brother S. C. Silsa rather hard and carries the matter in no better shape than it was. Having been raised in a wagon shop and having worked for more than twenty different smiths I have had a good deal of experience in setting tires, and the most successful way that I have found for the common smith is to drive a chisel between a joint in the felloe and tighten up the rim and tire according to the condition of wheel. A new wheel does not need as much draw as an old one and you should generally give a hind wheel nearly three eighths of an inch draw, the front one one fourth of an inch. For buggy tires, do not give them any except just what heat there is in the tire from upsetting. Never have a wheel dished unless the tire becomes loose. I think it is a good idea to have a wheel bench and screw the wheel down, especially buggy wheels.

THE AMERICAN BLACKSMITH is all right. I am always glad to see it come and I most always read it clear through, advertisements and all. I have found a good many things in it that are of practical advantage to me.

S. J. Wahl, Montana.

Jefferson County, Nebraska, Prices.— The price list of Jefferson County. Nebraska, is as follows:

18 88 10HOWS:	
New shoes (machine)	
Resetting shoes	. 25
Bar shoes, common	.75
Bar shoes, handinade	1.00
Stallion shoeing, light horse	3.00
Stallion shoeing, heavy horse	4.00
Side and toe weight shoes	.75
Neverslip shoes, eight shoes	5.00
Packing feet (leather, tar, and oakum)	
each	. 20
Shoeing mean and fractious horses,	
extra	1.00
Trimming feet, per horse	. 25
New pole, complete	6.00
New axle	3.50
New bolster, old irons	2.50
New sandboard	1.75
Bent hounds, old iron	3.50
Hind hounds, old iron, each	1.25
Tongue put in old irons	3.50
Cutting down wagon wheels and old	
tires set	10.00
Filling and rimming wheels, new, old	
tires	19.00
New axle stubs to 1 inch, per set	7.50
New axle stubs 11 inches, per set	10.00
New axle stubs 1½ inches, per set	12.00
	1.00
Axle set	1.00

Other prices in this county are proportionate to the above. E. RODERICH, Neb.

From a Mississippi Smith.—I am a fond admirer of your paper, as it has done me more good than years of experience in the shop. My shop is thirty by sixty feet and one story high. I recently installed power—having read so much about power in your paper I purchased a gasoline engine. This engine runs a drill, two grindstones, and a rip saw, and I intend to install an emery wheel, a lathe, boring machine, and a power hammer in the near future. I have a good helper and between us we can do almost any kind of a job. Here is my price list:

Wagon tongue\$1	.50
Reach poles, each	1.00
Head blocks 1	1.00
Tongue circle	
Welding brace irons	
	1.50
	1.75
Sharpening pony plow points Laying same	.10
New shoes, each	.25
Old shoes reset, each	.20
Heel and toe calks, each	.50
My other prices are in proportion	to

Axle Lengths Again.—In your September number I was surprised to see an article from "W. H.," on page 282, in which he claims that a front axle should be shorter than the back one. It must be a misprint, for my experience has been just the reverse. In order to get a plumb spoke (which should be done) a straight edge must be tried across the wheels with the

the above. E. G. Howorth, Mississippi.

axle reversed If the wheel is true, the straight edge will bear evenly on the surface of the tires, if the arms are right. The length of the front axle should be longer than the back one in proportion to the difference in the height of the wheels.

To demonstrate: Two wheels of the same make and height, (say four feet) dished precisely alike will measure exactly the same distance from the back of the hub to the rim. Now give the front wheels the same dish, three feet high, and they will measure one fourth inch less than the back wheels did. Therefore, as a general rule, the front axle should be one fourth or three sixteenths of an inch longer than the back axle, but never shorter. The top part or rim of a wheel is not considered in getting a plumb spoke; it is the bottom which becomes a fixed point and the axle must be set down to bring the spoke to a perpendicular or plumb bearing.

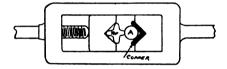
I regard axle setting as the most important part of carriage building, not only as regards the wear and tear, but when the axles are wrong, it wears on the horse. W. H. Gunn, Virginia.

A Letter From Kansas.—As I have never written you anything in regard to the craft I will tell you a few things for the good of the order. I have stood by the forge for twenty-six years and pretty nearly know the ups and downs. Since I commenced to run a shop for myself twenty-five years ago, prices on all materials have advanced nearly one half all around, but we haven't been able to raise our prices to come up to the other fellow. Consequently, we are not getting what is due us, and to raise them where they should be we would certainly rob the farmers. I was reared on a farm and I know all about farm life. My shop is in the country, and I raise most of our living. My boys do the farm work and I work three hundred sixty-five days each year in the shop. I make the repairing of machinery a specialty. I order my repairs for all kinds of machinery. This gives me the lead in this business. I also order farm implements and buggies. In regard to the machine-repair business we are the fellows to whom the machine-repair business belongs. We might as well do the ordering and get the profit. I buy anything I want, others can and should do the same thing. The repair business belongs to the blacksmith, so let's stand together and then things will come our way. I furnish, I presume, and put on more sections than any one in these parts. I usually use one thousand to one thousand five hundred each year. One year I used two thousand. Now, don't think for a minute that I am saying some of the craft are asleep, not at all, but wade in and buy those repairs, for it belongs to us.

Samuel Dice, Kansas.

To Cut Left-Hand Threads.—I want to ask a question: How can a man cut a left thread with a right-hand die? I have seen an article to that effect in The American Blackshith, but am unable to find it. Can someone give me a pointer? I understand it can be done, but how I do not know. Franz Wenke Missouri.

In Reply.—A left-hand thread can be cut with right-hand tools by using a combination of the regular adjustable tap wrench and a right-hand tap. Open the jaws of the wrench to admit the tap of the required size and the rod to be threaded, see A in the engraving. The rod A is backed with a piece of soft copper so the threads will not be injured. Now turn



TO CUT A LEFT-HAND THREAD

your thread by holding the end of A in the vise and turning the tap wrench. Of course, this method will not cut as good a left-hand thread as left-hand dies will, but it will cut a fairly good thread for general needs.

A. O. W., New York.

A Letter and Prices from the South.—As I haven't seen anything from our part of the country I will try and tell the brother craftsmen something about our shop work. We run our shop with a three-horsepower Fairbanks-Morse gasoline engine. Our power tools are a rip saw, a cut-off saw, and a bandsaw, a wood lathe, a grind stone, a drill press, a wood planer, and an emery grinder. We intend putting in a power blower soon. We have all kinds of hand tools. Our work consists mostly of repair work. We do no shoeing, as we have plenty of other work. We get our hardwood from a saw mill in the country at twenty dollars per thousand feet, delivered. Prices are low here.

Prices are low here.	
Filling wagon wheels from\$3.25 and u	p
Front bolster ironed \$1.7	
Hind bolster ironed 1.5	C
Straight tongue	0
Tongue hounds 1.5	0
Axle hounds 2.5	0
Front axles	0
Hind axles 1.7	5
Singletrees, per pair 1.2	
Doubletrees, per pair	-
Neck yoke	
Wagon bodies 9.00 and u	ľ
Buggy bodies 6.0	
Recovering buggy tops 5.00 to 8.0	
Sharpening plows	-
New ground plow stocks 1.5	
Top harrows 3.50 to 4.0	
Side harrows	
Buggy poles complete 5.0	-
Buggy shafts 3.5	
Painting buggy 5.0	
We have a good trade. We read TH	R

We have a good trade. We read THE AMERICAN BLACKSMITH and are glad to learn of anything which may assist us in business. W.O. HUMPHRIES & BRO., La.

A Letter from an English Smith.-Personally I cannot speak too highly of THE AMERICAN BLACKSMITH. It has been of considerable help to me in every branch of the trade. Before I became a subscriber I took little interest in shoeing, but during this past year I have improved more than fifty per cent both in practice and scientific knowledge of the art. I can now get all the horses I want and more, to shoe. This is not a good district for pay with regard to shoeing as we only get two shillings and six pence (60 cents) a set for shoes of 11 by 1-inch stock, plain plates, of course, no toe pieces or heel calks. I have one or two customers who come begging me to shoe their horses and offer to pay me three shillings per set if I will do the work, of course, I accept.

My shop is situated in the center of the china-clay district, where probably most of the china clay for America is procured. So my work is chiefly mining machinery and tools. Our engine repairs are mostly for steam engines.

I believe in power, in fact, I am the only one in this district to put my belief into practice. We have a little three-horsepower oil engine which drives a blast for two fires, one turning lathe, one drill press, and one grinder. We also have a tire bender but we get little work in this line.

When I was in America about a year ago, everything seemed so strange that I thought England was as far advanced as America with its "boost." But since I have been back home, I can see where we are not making as much of our opportunities as the Americans do generally and we are too slow to know a good thing when we see it. You Americans are far ahead of us in the way of tools. Why, it seems as if you have a handy tool for every kind of a job while we are still as old fashioned as ever.

On Pitched Ankle and Interfering.-Will say to Mr. J. M. Austin, of Tennessee, you have been making the pitched ankle, or cocked ankle, I call it, worse instead of better. True you might think you were successful to an extent, but the poor horse only showed these signs through great pain on account of so much misery standing cocked. Now, if you will put on calks and trim the toe more, for I presume you have left the toe extra long to force him back from the cocked position when you should have raised the heel and lowered the toe to put the horse in an easy position, you will eventually cure the trouble. I cured one this way after it had been cocked for nearly four years and an old horseshoer had put all this time to lowering the heels.

Now, just a word about interfering horses. I don't agree with Mr. L. B. Shreves, of Ohio, on the subject at all. What he said in the August issue made me think of what a neighbor smith of mine put on his calendars: "Not better than the best but better than the rest." Now, Mr. Shreves may not have meant it that way, but it is there just the same. While the brother that says he can stop any horse the second shoeing may be over confident. Yet if we don't have confidence in our ability to do a thing, we are liable to make

a "fizz." Mr. Shreves said he had seen horses "no man could stop." He has drawn a line on me as well as thousands of others that have had more than ten years of experience. Well, I haven't had quite the experience that Brother Shreves has, but I stopped one case of interfering after seven or eight horseshoers failed and the horse had been on pasture eighteen months because he couldn't go without shoes and the owner wouldn't put on boots. I stopped him after three shoeings. The first time I did not try to stop him, simply shod him straight, not knowing

if he ever learned of any new machine, tool or article of equipment except through advertising? If he has, it was exceptional. If it were not for our advertising columns how would the great body of the trade know about calk machines, new-style calks, tire setters and the various labor-saving devices that are continually appearing and being improved? The advertising columns of a modern craft journal are an education in themselves, if a man but knows how to study them.

"Not enough questions and answers" seems rather absurd in face of the fact that the October paper contained over six full pages of "Queries, Answers, Notes."



THE SHOP OF MR. WILLIAM BARBER IN YORK STATE.

his action. I stopped one here that a horseshoer had been working on over a year, and I can say I have got my first horse yet to fail on. So why shouldn't I have some confidence in my ability to shoe interfering horses? Mr. Shreves should get a copy of Professor Rich's book "Artistic Horseshoeing' from the Editor of "Our Journal." It will pay any horseshoer to have a copy of this book in his library. My copy has already been worth fifty dollars to me and I wouldn't take fifty for it now and do without it.

W. CHAMBERS, Washington.

A Criticism from Tennessee.—You give too much space to advertising and not enough to questions and answers. Your paper is good for the city smith where the auto has to be repaired, but has not enough for the poor country smith. You should give more on horseshoeing, wheel building and axle setting and such like. The auto department is all right for those who live where they are run, but they are not used in this part of the country. But there are some in the adjoining country. Benton's letters are all right and some others are good but there is not enough practical blacksmithing in your paper to suit me. But I hope that I may become more satisfied with the paper in the future.

R. E. H., Tennessee.

In Reply.—We have already thanked Mr. H., by mail, for his kind letter and have told him that we will gladly publish his letter. We are very glad to get a plain, outspoken letter like this and we vant to take up the points covered in Mr.

H's letter one by one.
Mr. H. says "too much space to advertising." Just let us ask Mr. H.

The September paper contained a good deal less on account of the space required for the volume index. But August contained four and a half pages of "Queries, Answers, Notes." As for the automobile department, we are aiming not alone at the city smith but at the country smith as In fact, the country smith is better situated to care for the automobile than his city brother, by reason of the garages and repair stations already established in the city. Mr. H. will have need for the city. Mr. H. will have need for automobile knowledge in the not very distant future, for the motor vehicle is gaining in popularity at a surprising rate.

As for more articles on horseshoeing,

wheel building and axle setting, all of these subjects have received a full share of attention. Horseshoeing, for instance, was featured in both the August and October Wood working and vehicle buildpapers. ing was the feature of the November paper and axle setting is getting attention in every issue of "OUR JOURNAL."

Mr. Reader, you have read Mr. H's

letter, you have read our remarks, allow us to rest the case with you. We have simply and plainly stated conditions as they are in reference to Mr. H's letter and every single reader of "Our Journal" if he will but look through the recent issues can see for himself.

We want to open this matter for general discussion and want plain, outspoken letters from other members of The American Blacksmith family. If we are giving you articles that you don't want, if we are publishing more than is necessary on some subjects, we want to know about it. have commented upon Mr. Hs' letter, now we want your ideas. THE EDITOR.

About Vicious Horses.—I have not written anything for publication in

Journal" for some time, but in reading over the August issue I saw something that made me smile. It is what Brother J. H. Fulton has to say about handling vicious horses. I mean in handling them by kind words and caresses. Now, I have no idea where this brother does his shoeing, but I would like to ask him if he ever shod a genuine Texas mustang or a genuine Spanish horse. If he has not, he has lived all his life for nothing. Now, I know that gentleness is the only way that you can shoe some horses, but on the other hand some horses require a good thrashing before you can do anything with them. A man must be a good judge of horse nature before he can shoe successfully. I have been shoeing for the past ten years nearly all over Texas and have never failed to shoe but one horse and I put three shoes on him and would have put the fourth on but I could not get a rope on his hind foot. The reason of this was he was "goosey" and just as soon as he felt the rope he would have a fit, and I actually believe he would have killed himself if he had been fastened so he could not get loose. Now, in this instance gen-tle treatment would work.

I have another in my mind; when I first came to this place about three years ago one of our doctors sent us a horse to shoe. My partner told me that I would have to handle him very easy or I could not do anything with him. So under these circumstances I went at him as if he was a bad egg, but before I was half through I was about worried out. I seized a board and give him a good going over and since that time I have never had any trouble with him. I don't advocate beating a horse with a neck yoke or wagon spoke, or even with a hammer, but I have found that a good beating does some animals real good.

Now, I will give a little experience I had with a mule the other day. The animal was a natural fool and had never been shod or had its hind feet handled. So I had considerable trouble in getting his feet at all, but finally I succeeded and was finishing his left hind foot when he got worried or concluded that he had enough and continually jerked his foot. Well, I thought to make him stand still, so I dropped his foot and turned around with my back to his head and gave him a slap on the flank. Well, as I afterwards found out, the mule was already scared and when I slapped him it scared him worse and he kicked me twice before you could wink your eye. You see in this instance it would have been better had I kept my hands off him, but it won't work in all cases. J. A. Lowry, Texas.

In Reply.-Mr. Lowry, of Texas, asks if I have ever shod a Texas mustang. In reply I regret to say that I have not, although the regret is not so deep as to make me feel that I have "lived all my life for nothing." If it had been my one and only object in this life to shoe a Texas mustang I would certainly have been down in the Lone Star State long ago. But to get back to the subject; in my article in the August paper I did not mean to convey the impression or idea that there was no exception to the rule of gentleness as a means of conquering the vicious animal. What I did mean to impress upon the reader was that gentleness, firmness and a patient, even temper will succeed more often than thrashings or beatings with a board. To cite Mr. Lowry's examples, for instance, he admits that of the three cases which he details two would have succumbed to gentleness, where rough handling only made thanimals worse. J. H. Fulton, New York. made the

Herbert Jeaner, patent attorney and mechanical expert, 600 F St., Washington, D. C., establishington; T. C., establishington; T. I make an investigation and report if a patent can be had and all information. Trademarks registered.

CUMMINGS & EMERSON Blacksmith and Wagon Makers' Supplies.

PEORIA. ILL.

WING RUBBER CARRIAGE TIRES

are made from tough, durable, lively NEW RUBBER. Quality is the first consideration. Our "Wing" Tire will outwear several ordinary rubber tires. The wings (see cut) keep water, sand and grit from working between the channel and the tire, to wear out the tire from underneath. Write for particulars.

THE GOODYEAR TIRE & RUBBER CO., Akron, Ohio. Trade Mark. Carriage Tire Department

100D YEAR

Boston, New York, Buffalo, Chicago, Cincinnati, Detroit, St. Louis, Denver, Los Angeles, SAN FRANCISCO, 506 Golden Gate Ave. CLEVELAND, 323 Frankfort Ave., N. W. PHILADELPHIA, 4404 Ridge Ave.



DERBY SCREW PLATES



Write for COMPLETE CATALOG of up-to-date screw-cutting tools. SENT FREE.

are known for their uniform accuracy and strength. The careful mechanic relies on them for perfect work. If you're not using Derby tools, ask your dealer for them the next time you buy. They will satisfy.

BUTTERFIELD & CO.

DERBY LINE, VT., U. S. A.

SUPERIOR **Horse Rasps**

The Best Yet

Best High-grade Steel. Hard, Thorough Temper. Sharp Cutting Edge. Sharp, Strong Teeth, Well Backed.

Every Rasp Perfect

and Warranted:

Made in all regular sizes, and in the new 18 inch Slim, which gives the user the advantage of a long stroke, = and at the same time a rasp of medium weight. ==

ASK YOUR DEALER FOR THEM

Gunsmiths' Materials Basrels, locks, such hammers, springs, nin LYMISHIHITIS PRAIGTIMES hammers, springs, nipples, plungers, screws, builet molds, mountings, wiper forgings, castings, and repair parts for all guns and revolver foreign and American, in rough, unfinished, and finishe state, ready to put in. Flinished knive blades, fine stee in bars or sheets.

Large illustrated catalog free.

Great Western Gun Works & Supply Co.. 529 Smithfield St., Pittaburg, Pa.

Goods sent by mail or express to any part of the United ates. Please mention The American Blacksmith.

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Invest in some good books and then judge for your-

self if it doesn't pay.
Their pages tell you how
to do many a difficult job. You cannot afford to be without these:

Forge Practice.

A most valuable treatise upon forge work by John L. Bacon. The book is profusely illustrated and contains chapters on weld-ing, upsetting, drawing out, bending, me-tailurgy and calculation of stock, also talles and formulas. It has over 250 pages and is very neatly bound in red cloth. Price, \$1.50

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American Blacksmith Co. P. O. Drawer 974. BUFFALO, N. Y.

HONEST DEALINGS.

Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends, and their interests will be protected. As a constant example of our faith in American Blacksmith advertisers, we will make good to our subscribers loss sustained from any who may prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

Digitized by

Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, Nov. 26, 1908, and are subject to fluctuations. Corrected for The American Blacksmith by The National Heavy Hardware Reporter, Chicago.

Correspondents report no changes in prices	.
Horse Shoes—	
All Iron Shoes	\$4.40
Steel Shoes	4.25
No. 0 and No. 1 25c. extra. 15c. per keg	
additional charged for packing more	
than one size in a keg	
Mule Shoes	4.90
Featherweight Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Ideal Countersunk	6.00
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
Track Weight	9.50
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Merchant Bar Iron-		
\$1.90 to \$2.10 rates	full extras, and 20 cents pe	ì
100 pounds extra	for broken bundles.	

.....

Steel Bars \$1.90 to \$2.10 rates, full extras.

Toe Calks-

6 x and smaller Larger and longer	
Machine Bolts— 4 x i and smaller Larger and longer	60-10% 50%
Nuts— Less than 10 lbs, of a si From 10 to 50 lbs	ze
Washers— Same price as nuts.	Skeins— Cast 65%
Malleables— Common \$.09	Half Patent Axles — 65%

Springs— Single Spring, each Springs, black and ha	alf bright		\$1.25 .06
Hickory Lumber—Per 1 to 2½	Foot—		\$.09} 11
Ash and Oak Lumber— 1-11\$.0 11-2\$.0	71 21-3		\$.08 <u>1</u>
Yellow Poplar Lumber	-Per M.	Feet—	
	6 to 12	13 to 17	18 to 24
賽"	\$6 5.00	\$ 65.00	\$ 75.00
i	65.00	68.00	80.00
	68.00	75.00	85.00
[*]	72.00	80.00	104.00
Rough Hickory Axles-	_		Each.
3 x 4 6 ft			. \$.60
21 - 41 8 64			1.00

Rough Hickory Axles-				
3 x 4 6 ft	\$.60			
3½ x 4½ 6 ft	1.00			
4 x 5 6 ft	1.20			
5 x 6 6 ft	2.20			
4 x 5 64 ft	1.30			
	2.00			
	3.00			
5 x 6 6½ and 7 ft	3.50			
5½ x 6½ 7 ft	3.50			
Finished Hickory Axles—				
For 24 and 24 Skeins	\$1.00			
For 3 Skeins	1.20			
For 31 Skeins	1.45			
For 3½ Skeins	1.60			
	1.95			
For 3 Skeins	2.25			
For 4 Skeins	2.20			
Rough Oak Bolsters-				
Short	\$.08			
12-14-16 ft	.09			
The Late Acade Baladana				
Finished Oak Bolsters—				
2 x 3 and under	\$.65			
3 x 4	.70			
31 x 41	.90			
Rough Oak Wagon Tongues-	•• ••			
4 x 4 x 2 x 4 x 12 and smaller	\$1.00			

31 and smaller \$1.25 32 1.30 4 1,40

Finished Oak Wagon Tongues-

Two Inch Sawed Hounds Tongues Front Hind	.55
Patent Wheels— A. B. No.13 and under. D. No. 13 and under. All Grades, No. 17 to 33 All Grades, No. 39 and Larger. C. No. 13 and under.	40 % 30 % 35–5 % 20 % 35–5 %
Cupped Oak Hubs—Set. 7 x 8 x 9 \$1.10 10 x 14 7 x 9 x 10 1.10 11 x 14 8 x 9 x 10 1.35 11 x 15 8 x 10 x 11 1.50 11 x 15 9 x 10 x 12 1.70 12 x 16 9 x 10 x 12 1.70 12 x 16 10 x 12 x 13 2.60 13 x 18 11 x 13 x 14 3.65 12 x 14 x 15 4.50	\$2.90 3.60 4.00 4.50
Rough Sawed Felloes- 1 x 2 " \$1.55 2 x 2 y " 1 x 2 y 1.75 2 y x 2 y " 1 x 2 y 1.85 3 x 3 y 3 x 3 y 6.00	2.00 4.75 5.75
Ironed Poles, White, XXX— 11 x 21" No. 2 2 x 21" No. 3	\$4.00 4.00
Ironed Shafts, White, XXX— 1 " x 2 " and smaller	\$2.15 2.35 2.90
Farm Wagon Bows— Round Top, 1 x 2 " Flat Top, 2 x 2 " Round Top, 1 x 2 4"	\$.65 80 1.40
Standard size Piano Bodies with Seats— Each	\$4.25
Plow Beams— 1 Horse	85
All Hickory and Oak Spokes and Pater Discount from Weis & Lesh List No.	nt Spokes- 5 5%
Wagon Neck Yokes—	White
21 x 38" . \$2.15 \$2.95 21 x 42" . 2.90 4.05	5.60
2 x 46" . 4 .40 3 x 44" . 4 .70 6 .95	8.90 10.50
Single Trees—Oval— Mixed Forest Second Growth Second	White

Wagon Neck Yokes-	-	
	Mixed	White
Forest 8	Second Growth	Second Growth
21 x 38" . \$2.15	\$2.95	\$4.25
2 x 42" . 2.90	\$2.95 4.05	5.60
2 x 46" 4 .40	4.00	0.00
3 x 44" . 4.70	6.95	8.90
3 X 44 . 4.70	0.80	10.50
3 x 48" . 5.50		10.30
Single Trees-Oval-	_	
-	Mixed	White
Forest 8	Second Growth	Second Growth
24" \$1.60	\$2.90	\$3.50
2 1.70	2.95	3.60
		3 80
217 1.80		4.20
3 x 36" 2.45	0.00	4.20
3 x 38" 2.50	4.00	4.05
3 x 40" 2.65		4.85
Single Trees-Round	1- Fores	t Second Growth
2}*		\$3.60
21	2 10	3.65
2	2 i	3.75
2	2.2	4.25
21	2.4	5 4.80
3	3.4	7.00
Oval Plow Doubletre	ees— Flat Pic	ow Doubletrees—

3 " 3.40
Oval Plow Doubletrees— Flat Plow Doubletrees—
24 x 36" \$1.75 11 x 31 x 42" \$3.00
3 x 40" 2.55
Wagon Doubletrees—
2 x 4 x 48" \$3.60
21 x 48"
21 x 41 x 50" 5.20
21 x 44 x 52" 5.60
24 72 44 72 72 73 74 74 74 74 74 74 74 74 74 74 74 74 74
21 20 202
Mixed Second Growth 50 % advance
White Second Growth 100 % advance
Oval Plow Singletrees— Forest
21 x 30" and under\$1.00
21 x 30" and under
Buggy Doubletrees— Mixed White

		Mixed	White
	Forest	Second Growth	Second Growth
2½″ and smaller	-	-	\$4.60
Express Dou	bletree	Mixed	White

	Mixed	White
Forest	Second Growth	Second Growth
21" \$2.95	\$ 3.65	\$5 .00
21″ \$2.95 21″ 3.55	4.15	5.50
3 " 3.55	4.30	5.75
Express Singletrees,	Turned-	
	Mixed	White
Forest	Second Growth	Second Growth

		MIXOU	*************
		Second Growth	
21"	\$2.50	\$2.65 3.65	\$ 3.75
2 i "	2.90	3.65	4.00
21	3.50	4.00	4.75
Express Sine	rictrees.	Square Center-	-

Ì	Express Singletrees,	Square Center-	_
i	Lapiess Singletrees,	Mixed	White
	Forest	Second Growth	Second Growth
	21" \$3.00		\$ 5.25
	24" 3.50	5.45	6.00

Buggy Neck	Vokes-					
Dugg, Moon		Mixed	White			
			Eccond Growth			
		\$ 3.15	\$4 .50			
21 x 21 x			- 45			

LUDVIGSEN BROS. WELDED STEEL CENTER TOE CALKS



This calk is made sharp and will always wear sharp. Just the calk for winter. Samples sent on request. Manufactured by

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The Campbell Iron Co. ST. LOUIS, MO.

Carry complete line of Horseshoers' Supplies, Wagon and Carriage Material. WESTERN AGT. FOR DITZLER COLORS IN JAPAN.

Write Dept. B. your requirements.







HARVEY SPRING CO., BACINE JUNCTION, WIS.

MORGAN & WRIGHT PADS ARE GOOD PADS





of	per set for wheels with flat	and rubber tire on, and hubs bored			wheels for	
Size	steel tire on and hubs bored	36 and 40	38 and 40	40 and 44	axles and boxes set	
3/4 7/8	\$7.00 7.25	15.25	15.55	15.85		
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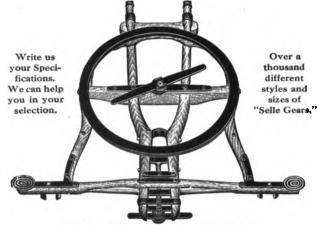
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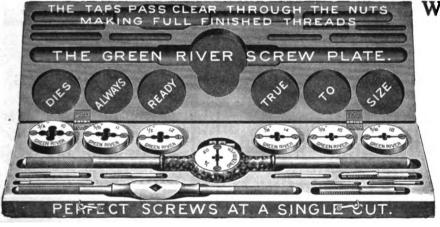


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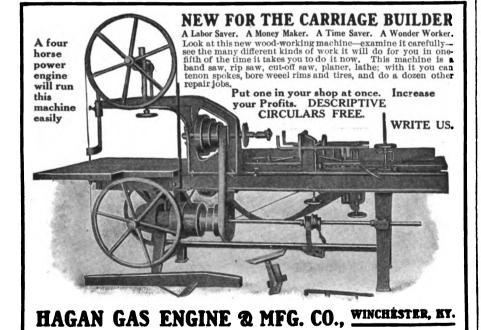
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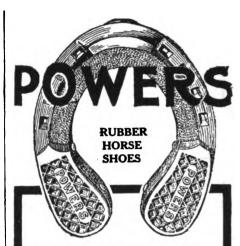


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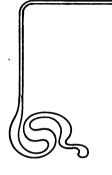
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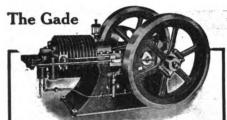
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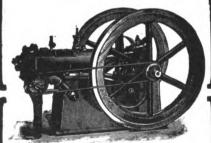


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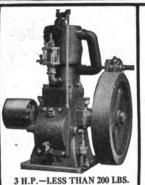
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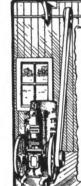


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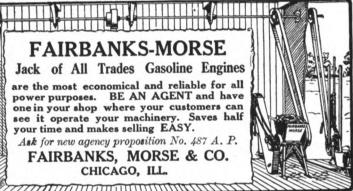
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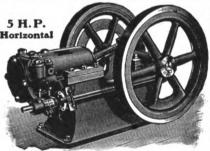
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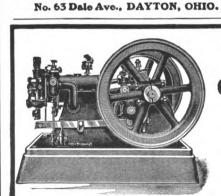


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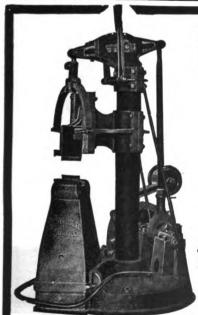
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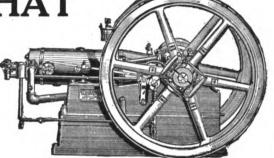




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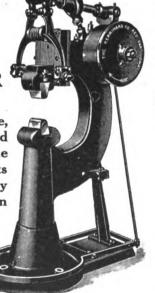
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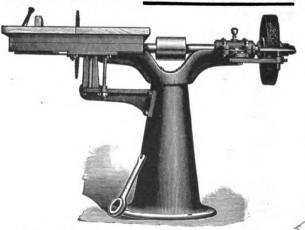
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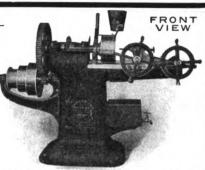
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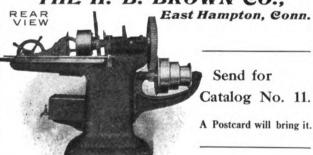
Best on Earth



A Bolt Cutter is Much Like a Man in This THE HEAD IS NEARLY EVERYTHING

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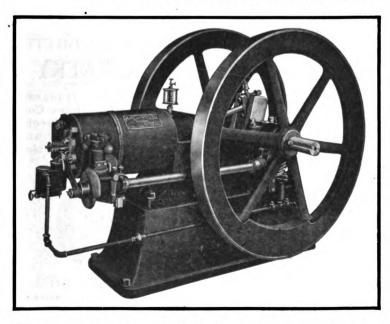


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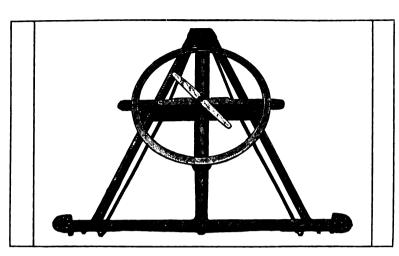
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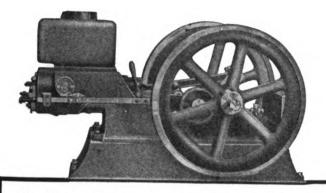
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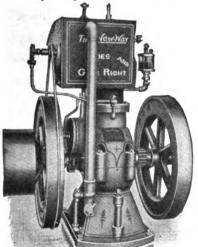
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It is a 3 H.P., air-cooled engine, carefully built and fully guaranteed. It will run lathes, drills, blowers and numerous other machines, and more than pay for itself in a few months.

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Write and tell us how much H. P. you want and we will promptly quote you prices on the engines we have which would suit your requirements.

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THE FORGE THAT PLEASES THE SMITH FITTED WITH A BUFFALO 200 BLOWER

The greatest value in forges ever offered to blacksmiths. It is the highest type and most practical cast iron forge

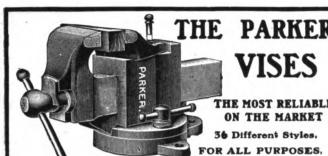
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was written by E. R. Markham, a steel worker with some 27 years of actual experience. He should know-he does know. His book will give you all the information you may need concerning steel. Neatly and substantially bound in green library cloth with gold titles.

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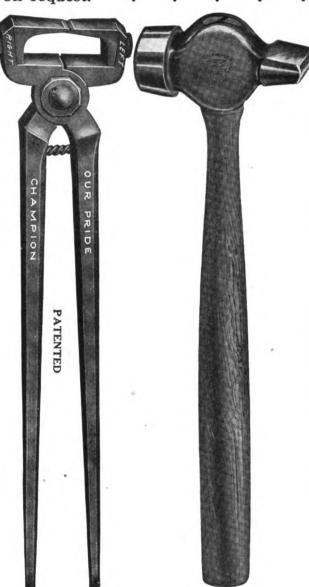
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Trade Literature and Notes.

NEW HARDENING SOLUTION called

Trade Literature and Notes.

A NEW HARDENING SOLUTION called Kalux is being advertised for the first time in this issue of The American Blacksmith. It will well pay our readers who are interested in tool and steel work to investigate this product of the Metal Hardening Solution Company, Rochester, N. Y. This company will gladly send upon request testimonials from big Railroad and other shops throughout the country who have successfully tried out their solution. An attractive booklet and sample of Kalux sent free. You can test it yourself at no expense. Write them today.

MR. OLIVER J. PRENTICE, for eleven years with the Long-Critchfield Corporation, of Chicago and New York, is now advertising and sales manager of the automobile department of the W. H. Kiblinger Company, of Auburn, Ind. We understand that in making the change Mr. Prentice is actuated by a desire to raise chickens and do a few rural stunts. The W. H. Kiblinger Company are advertising in every issue of The American Blacksmith and are widely known on account of the success of their high-wheel motor vehicles. No doubt, many of our blacksmith readers are acting as their agents and are making good profits in selling these vehicles to their friends.

THE GAS ENGINE is an important factor in the smith shop of today. So much depends on it for running the shop smoothly and economically. When buying an engine it is therefore of the greatest importance to see that one is obtained that will do all that is required of it without breakdowns and expensive repairing. Those of our readers who contemplate installing a new engine in their shops during the coming season will make no mistake in writing the White Lily Manufacturing Company, of Davenport, Iowa, and learning of the exceptional merits of their line of engines. A catalogue and prices will be gladly sent to any address by writing them. Our readers may also consult their advertisement on another page of this issue.

A NEW DEPARTMENT has been originated by the Parry Manufacturing Company, of Indianapolis, In

interest to the blacksmith and vehicle repairer, for it has been established to supply their particular wants for repair parts of vehicles. They especially wish to call attention to their facilities for prompt service and quick shipment. In connection with this new department a new and attractive catalogue has been issued. This is well illustrated and contains prices on their full line of vehicle accessories. Every one of our readers should have a copy of this catalogue in the shop where it can be consulted. Write the Parry Manufacturing Company for a copy, giving your address, and it will come to you by return mail.

THE TEMPLE PUMP COMPANY, of Chicago, who have been continuous patrons of our columns, are pioneers in the manufacture of Multiple Cylinder Gasoline Engines. This firm is now in its fifty-fifth year. The Master Workman, a double-cylinder gasoline engine, was the first in the field. Now, the whole course of progress in the making of gas engines is towards the multiple cylinder type, engines of two, four, six and eight cylinders being made. The Temple Pump Company are now manufacturing two and four-cylinder engines for general use.

The advantages of the two and four-cylinder

manufacturing two and four-cylinder engines for general use.

The advantages of the two and four-cylinder engines are: Economy in the use of fuel, greater certainty of continuous running, quick and easy starting, less cumbersomness. Any of our readers in need of an engine should write the Temple Pump Company for catalog of their full line of engines.

THE MORGAN POTTER COMPANY, of Fishkill-on-Hudson, N. Y., sole manufacturers of the Potter "Spring" Brake Blocks and the Potter Complete Adjustable Brake, have an advertising wagon out on the road demonstrating the many good features of the Potter products. The vehicle is a one-horse, light-top wagon attractively lettered and painted in orange and black. It is fitted with a Potter Adjustable Brake, one of the back wheels having a rubber tire and the other being steel. This is for the purpose of demonstrating the adaptability of the Potter Brake to either tire, and especially the rubber tire, which is practically as good as new, after five months' severe test over hilly country.

The wagon began its career last May and accompanied by Mr. P. V. Potter, a son of Morgan Potter who is president of the firm, has covered some of New York, Connecticut, Massachusetts and Vermont, or a total distance of over 1,000 miles

in all.

The wagon is now working south for the winter, accompanied by R. Weston Doherty, who is calling on the blacksmiths and the trade en route.

As an advertising venture it seems to be a direct way of reaching the trade, as a sort of follow-up method to trade-journal advertising.

Watch for this wagon—it may be coming your way.

wethod to trade-journal advertising.

Watch for this wagon—it may be coming your way.

WE ARE PLEASED to call the attention of our readers to the Griffitts Belt Power hammer being advertised in our columns. This machine is built along rather unique lines. It is made of steel and every part of the machine is riveted, so that it will always be firm and never work loose. In designing this hammer the manufacturers have combined the seven chief elements which go to make up a first-class tool, namely, lightness, simplicity, ability to stand hard usage, constructional strength, freedom from derangement, low first cost and, what is most important, exceptionally low cost of maintenance. The first hammer of this type which was built five years ago is now in use in one of the largest wagonmaking establishments on the Pacific coast, and the only repairs necessary during this time consisted of the renewal of one leaf in the main spring.

This power hammer is especially designed for blacksmiths and wagonmakers. Unlike the ordinary hammer, it is claimed, it strikes a flat blow and will weld a tire and edge it up in one heat, leaving it in perfect shape with both sides of an equal thickness. The machine operating at slow speed enables the blacksmith to see perfectly what he is doing.

Our readers will no doubt be anxious to learn about this machine more fully. The manufacturers will gladly furnish description and testimonials from firms who are using this hammer. Address The Griffitts Machine Works, 107 Fremont Street, San Francisco, California.

GOOD CRAFT BOOKS ARE A VALUABLE INVESTMENT. Below are listed some of the best.

Foden's Mechanical Tables save figuring. They tell at a glance just how much stock to use for round or oval hoops of any size, the circumference of circles, weight of fiat, square and round stock and the weight and strength of ropes and chains.

Price, \$,50

Plain Gas Engine Sense by E. L. Osborne. This is a very neat pocket-sized book which tells you gust what you want to know about your gas engine. It is well illustrated and prepared especially for the beginner. Technical terms have been avoided and the matter is classified and indexed for ready reference. Over 150 pages, strongly bound between boards.

Price, \$,50

The Practical Gas Engineer by E. W. Longnecker, A manual of practical gas and gasoline engine how to erect, run and care for an engine. It is plainly written and tells you all about your engine. Over 140 pages, neatly and compactly bound in green cloth.

Practical Carriage and Wagon Painting by H. C. Hillick. A very complete book on the painting. Also tells how to equip the paint shop. Fully illustrated and well bound in silk library cloth.

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Rich's New Artistic Hersesheeing by Prof. Geo-E. Rich. This book contains photographic illustrations of over 280 styles of shoes and twelve full page plates, two of which are colored. It contains over 200 pages of practical scientific matter on anatomy of the foot, how the hoof grows, curing lameness and faultvaction. the bar shoe, specific diseases and accidents, formulas, recipes, etc. Over 200 pages and bound in green library cloth.

The Scientific Steel Worker by O. A. Westover is a practical book by a practical man. It covers the subject of steel working very thoroughly for the practical man. It tells all about welding, tempering, forging, annealing and hardening steel. Contains numerous tables formulas and receipts. The book is neatly bound in blue and gold, contains numerous illustrations and 200 pages.

The American Steelworker by E. B. Markham. This is an excellent book on the subject of steel working by a man with over twenty-seven year's of practical experience in this branch of smithing. It covers the subject of steel thoroughly, from the purchasing of the material to the polishing of the finished product. Over 150 illustrations and 340 pages. Very substantially bound in price, \$2.50

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He's certainly to be pitied—the untrained man without a job. Just one of the hopeless, struggling crowd.

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And there's always a line of others "waiting to see the foreman" or rushing to answer the advertisement, for the poorest bread-and-butter job.

Just your two hands and your shop experience wouldn't carry you far if slack times should come.

Let your dread for the future stimulate you to do something now to improve your chances. Set your mind on the better position you want—and win it.

Don't waste your time "thinking it over"—don't build air castles, just buckle down and do it.

Why not make the start today that will keep you forever out of the hand-to-mouth class? Put in part of the long Winter evenings at home, fitting yourself for a better kind of work, and bigger pay.

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When you ask for an article you have seen advertised in The American Blacksmith, see that Don't let your you get it. dealer sell you something which he calls "just as good." Don't let a traveling man talk you into buying an inferior make. goods advertised in these columns are made by firms whose reliability we guarantee. You run no risk whatever in buying these goods Refuse imitations.

Insist upon getting what you ask for

YOUR LAST CHANCE! SEE PAGE 37 NOW.

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To Find Address of any Firm given here, consult their advertisement. For its location in this issue, see Index on Page 21.

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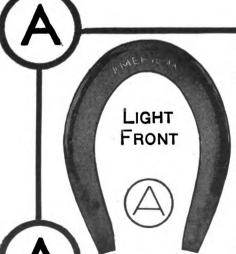
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The most complete line for you to select from. Material and workmanship guaranteed to be the best. Our shoes always give satisfaction.

The best Horse Shoes in the land bear this trademark, the stamp of quality



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COMPLETE CATALOGUE FREE Showing all Styles of our Shoes

AMERICAN HORSE SHOE COMPANY

Phillipsburg, N. J.







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We Manufacture SHEARS PUNCHES

Hand or power, for shearing and punching plates, bars and angles. Send for Catalogue C.

BERTSCH & CO. Cambridge City, Ind.

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Send for catalog showing and de-scribing the "ADAMS PATENT END PLATE

Also many other useful articles in your line. E, B, ADAMS & SON, RACINE, WIS.



BUGGY TOPS, \$4.60 TOP BUGGIES, \$35.00 RUNABOUTS, \$32.00 Cushion Backs, Storm Fronts, Poles & Shafts. Write for 100-page Catalog. BUOB & SCHEU, 500-520 Court Street, Cincinnati, Ohio

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et us submit an estimate on your printing requirements whether they be large or small.

Our facilities enable us to do work reasonably.

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See Page 21 for Index to Advertisers.



When You Buy Horse Shoes

Is it not preferable to make your selection from the most complete line and the best shoes on the market?

United States Horse

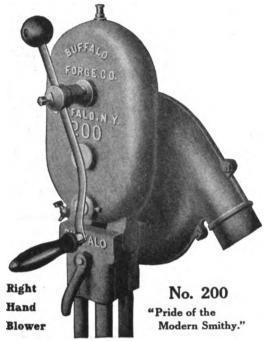
"In a Class by Themselves"

Our Illustrated Catalogue shows all sizes and patterns. The book is free. We will gladly send a copy to your address. Write today.

We are giving away a handsome souvenir stick pin to every smith who sends his name and address. Did you get one? Don't wait until they are gone. Write today.

United States Horse Shoe Company Rolling Mills and Factory, ERIE, PA.

Buffalo Geared Hand Blowers



Made Right or Left Hand at No Extra Cost

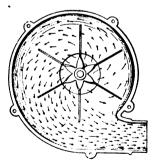
Thousands of Blowers Sold 30 Years Ago are Still in Good Working Order

Read the Guarantee Printed on the First Page of New 78 B Catalog. This guarantee goes with every No. 200 Blower and Forge having the No. 200 Blower Attached.

Why Buffalo Blowers Give the Strongest Blast with the Least Effort

The scroll shaped fan case distinguishing the No. 200 Buffalo Blowers has been adopted only because of its proven efficiency in delivering the most powerful blast. This advantage is made clear by the illustrations herewith, which show the course of air currents in both scroll shaped and pear shaped fan cases.

Which One Looks Best To You?



The outlet of the scroll shaped case is right in the path of the air currents, affording the easiest means of escape. All the air produced with each turn of the fan is delivered through the outlet. No air is carried past the opening and forced around the fan case a second time.



The OTHER Way

The BUFFALO Way



Buffalo Forge Company Buffalo, N.Y.



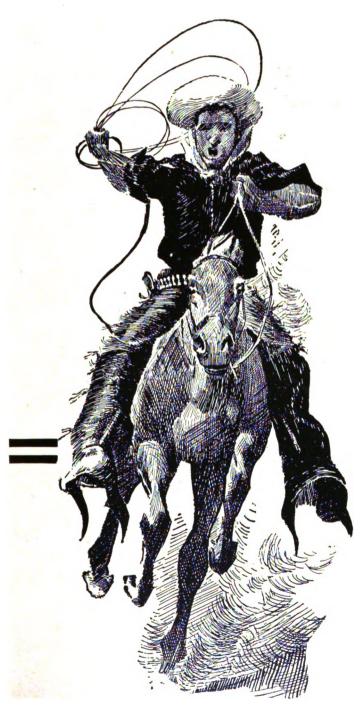








Round Up



The calk trade in your town. You can easily do it by using only H and Rowe calks. They will wear longer and sharper than any other calks manufactured.

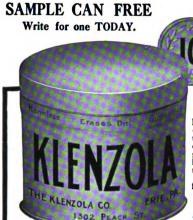
The H calks are *all-steel*, with six sharp cutting edges. They are made in Germany of Krupp steel. The cavalry of Europe are made secure with these calks.

The Rowe new tool steel center calks have a hard center of tool steel, welded from end to end. They have been thoroughly tested in actual service by President King of the Connecticut M. H. N. P. A. Remember the name.

The H & Rowe Calk Company

44 Mechanic St. Hartford, Conn.





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KLENZOLA

INSIST ON GETTING IT.

If you have never used it, dealers MAY try to substitute something else. If you HAVE used KLENZOLA, the great cleaner, you will not accept a substitute. Removes any grease or grime, paint, etc., from the hands, and guaranteed not to injure the skin.

Write us for sample or get a can from your dealer.

THE KLENZOLA CO., ERIE, PA.

1302 Peach St.,

SUPERIOR STEEL HARDENING

SOLUTION



SAVES YOU MONEY ON YOUR TOOLS

TO GET longer life and better service from your Carbon Steel Tools it is only necessary to add a certain proportion of KALUX to the water and then proceed as usual. For KALUX adds from 50 per cent to 150 per cent greater efficiency, thereby increasing production and decreasing cost of same. Sample and Booklet FREE.

METAL HARDENING SOLUTION CO. GRANITE BUILDING ROCHESTER, N. Y.

and Toronto, Ont., Canada.

Elizabethville, Pa., Oct. 28, 1908.

Dear Sir:-

Please send me the prices of your blowers. I have one of them and never had a better one. There was a blacksmith came to me and asked me what blower he should get. I told him the Buffalo was the best made. I would not do without a Buffalo Blower.

Yours truly,

JOHN DUBENDORF.



It is the Most Profitable Machine a Blacksmith can Buy

WRITE FOR CATALOGUE AND PRICES TO

Standard Tire Setter Co. KEOKUK **IOWA**



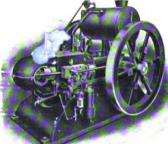
fits for you.

Let us send you descriptive circulars and prices.

Write us TODAY

ROCHESTER TIRE HEATER COMPANY ROCHESTER, N. Y.

LICHTNING **GASOLINE ENGINES**



Steam Cooled **Double Piston** No Foundation

Send for Catalogue Showing Superior Points, and get Prices

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FIRST MADE IN **AMERICA**

The Gold Medal Anvil HIGHEST AWARD

OMAHA, 1898 PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with the best Crucible Cast Steel. Every genuine "Hay-Budden" Anvil'is made by the latest improved methods.



Over 100,000 in Use WARRANTED

WEIGHTS FROM 10 to 800 LBS.

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality, Form and Finish to any others on the Market,

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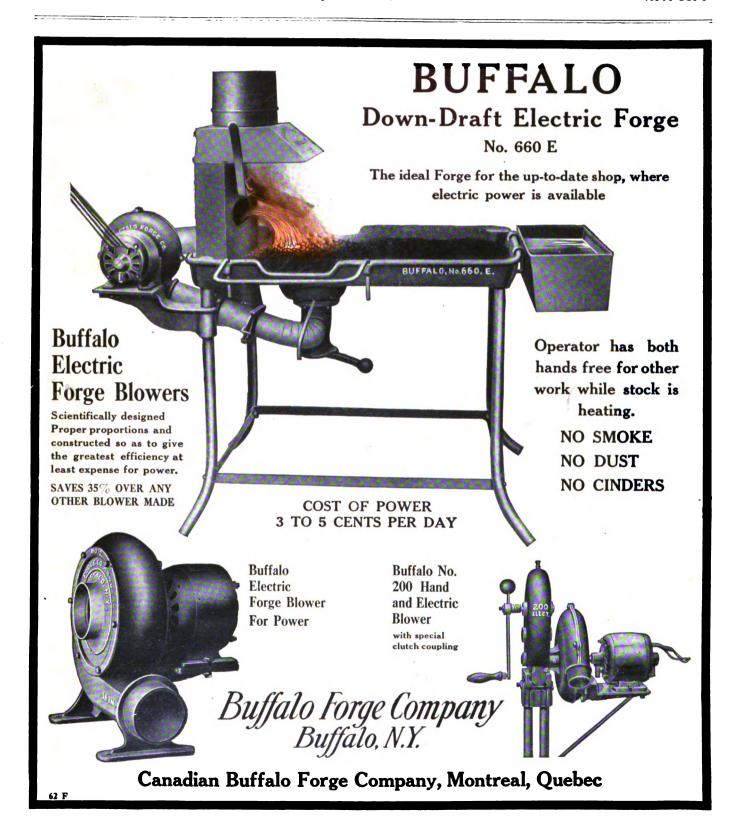
NUMBER 4

AMERICAN BLACKSMITH

BUFFALO N.Y. U.S.A. A Practical Journal of Blacksmithing and Wagonmaking

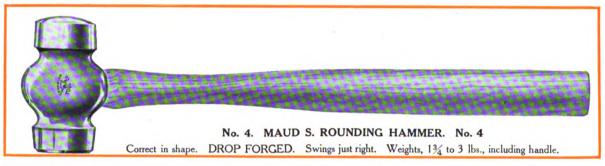
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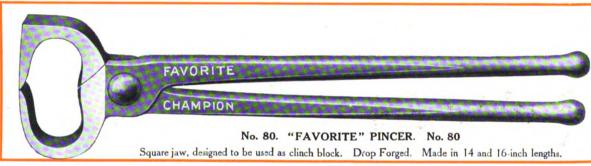
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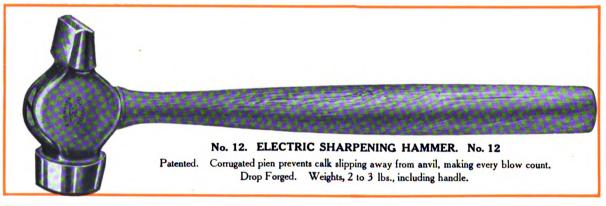


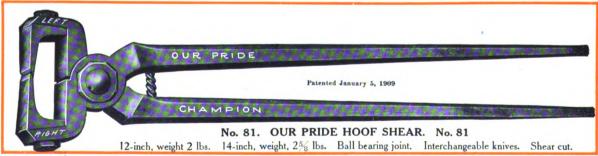
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Practical, Durable, Right in Price







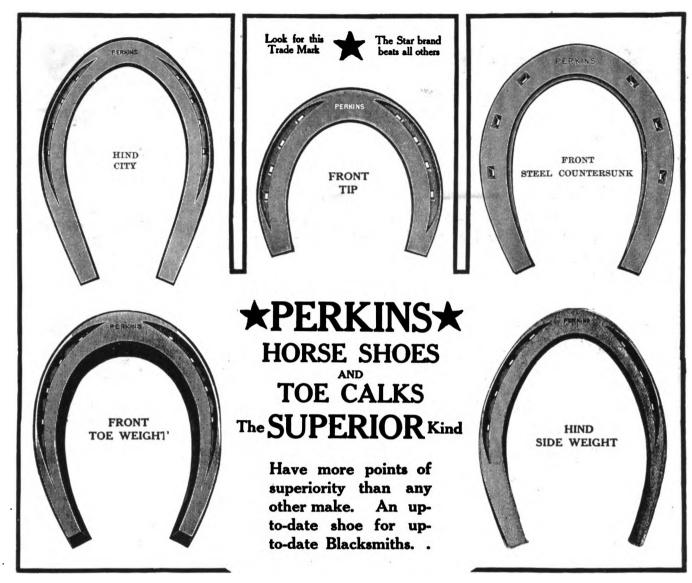


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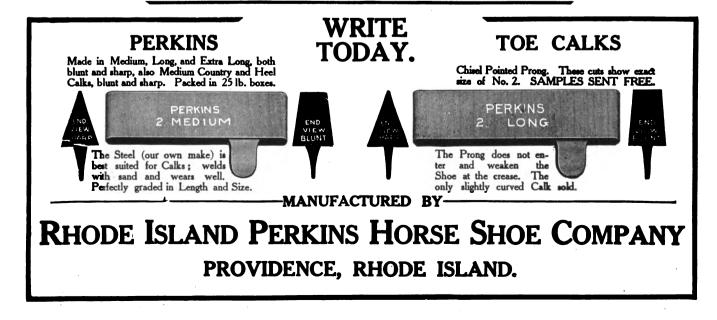
CHAMPION TOOL COMPANY

Department H

MEADVILLE, PA.



Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send COMPLETE CATALOG AND SAMPLE FREE



Send For This Tool Catalog

The tools shown on this page are only samples from the numerous ones illustrated in our loose-leaf Machinery Catalog.

We do not know how well your shop is already equipped, but we do know that when you need tools—whether it's a Band Saw or Jointer, a Post or Power Drill, a Portable Forge, or a machine for Boring Hubs, or for Tenoning Spokes—we know you can't find more all-around satisfaction anywhere than in the tools we manufacture.

That statement sounds a bit boastful, when you don't know our tools, but it sounds quite modest when you do.

If your visiting salesman tries to convince you that you can get your "money's worth" to better advantage elsewhere, just doubt his word long enough to send for our catalog and prices and find out for yourself. Of course, if the tool you buy isn't what we claim, you get your money back without a quibble.

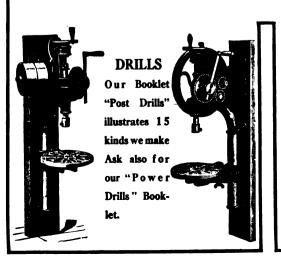
When you buy a machine it does make a difference what you get for your money.

Good quality is, after all, the only basis of machine merit; low prices or appearances don't last very long, if the machine isn't properly constructed and durable. The "quality" kind is the only kind you get in Silver machines.

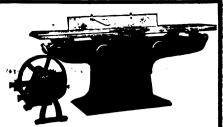
Ask for our Machinery Catalog with illustrations and full descriptions.

Silver Mfg. Company

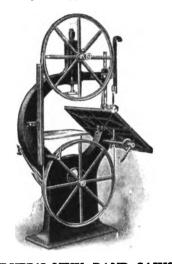
365 Broadway : : SALEM, OHIO





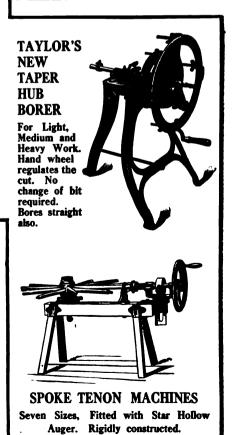


SILVER'S NEW JOINTERS Five sizes—8, 12, 16, 20 and 24 inch. New "patent applied for" features.



SILVER'S NEW BAND SAWS

Four Sizes—Patented tilting device for
table—All parts easily reached by operator—New ratchet foot power device on 20 inch machine.





Genuine Imported STEEL CENTRE



\$1.50 per 100

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All Sizes, in cases of 1,000 Calks of one size

NONE BETTER

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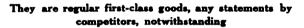
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Why they are so Cheap? Samples free on request!

Because we sell *direct* to the Shoer. Remember: Quality Guaranteed.

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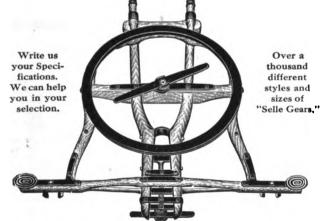
H-CALK CO., 111 Broad St., New York





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"SELLE GEARS"



THE SELLE PLATFORM GEAR

YOUR particular needs and requirements can be found in our complete line of Spring Wagon Gears. Each gear made by us, for its purpose, is perfect. Our reputation, built on years of satisfactory gear making, stands as a guarantee on every "Selle Gear" you buy. The best made at any price, and at the best price. Combination and three-spring gears in several styles, and trussed platform wagon gears complete, ready for bodies.

WRITE FOR CATALOG "4" FULLY ILLUSTRATED, SHOWING ALLASTYLES

The Akron-Selle Gear Co. Akron, Ohio, U. S. A.

Why Throw Away \$60.00?

Buy a STAR

Equal to any twice the price

"HOOK'ER TO YOUR ENGINE"



Star Foundry Co., Albert Lea, Minn.

Gentlemen:—We have the Star Hammer we purchased from you last Spring in use ten hours per day, six days per week. It has given very good results, and we consider it a First-Class Hammer for the money.

Yours truly,

NORRIS BROS.,
Robinson, Ill.

Star Foundry Co., Albert Lea, Minn.

Gentlemen:—I find the Hammer which I purchased of you one of the handiest machines I ever bought, and I would not be without one if the price were double the amount. Very satisfactory,

OTTO SCHWEER, Mapleton, Minn.

Every one warranted satisfactory Supplied through your jobber, or

Star Foundry Co., ALBERT LEA, MINN.

SAVE BOTH TIME AND MONEY BY PURCHASING ONE OF OUR

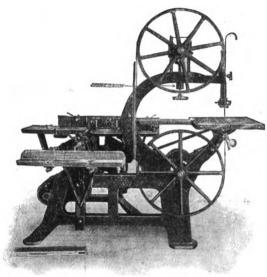
The only up to date, prac-tical machine on the market for the Blacksmith and Wagon Maker.

FAMOUS UNIVERSAL WOOD WORKERS

Built of the highest grade materials throughout. Sent on trial.

Cuts shown below will give you a fairly good idea of our Universal Variety wood worker with its various attachments. If you will write us immediately for our 1909 catalogue, it will describe to you thoroughly the great variety of work that can

be done on this machine; as well as many other wood working machines we build, consisting of



Band Saws Saw Tables

Jointers

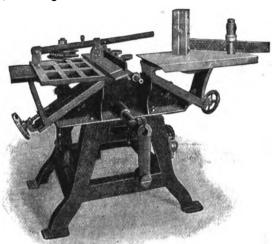
Shapers

Planers

Swing Cut Off Saws

Lathes

Boring Machines



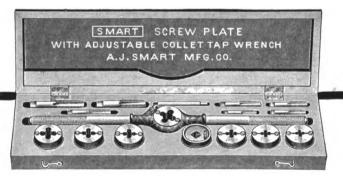
Universal Wood Worker, showing the Mortising Attachment and 27" band saw.

THE SIDNEY TOOL CO.

SIDNEY, OHIO

Universal Wood Worker, showing the Tenoning Attachment with traveling table





SMAR



Screw Plate and Start the Year Right. Buy a SMART

THEY ARE UNEQUALED FOR

OUICK AND ACCURATE ADJUSTMENT EASY CUTTING QUALITIES STRENGTH AND DURABILITY

THEY'RE MECHANICALLY RIGHT FROM START TO FINISH.

Full line of Taps carried in stock, including Horse Shoe Taps for hand and machine use.

If your dealer won't supply you, write us direct. Catalog mailed to any address.

A. J. SMART MANUFACTURING CO., Greenfield, Mass., U. S. A.

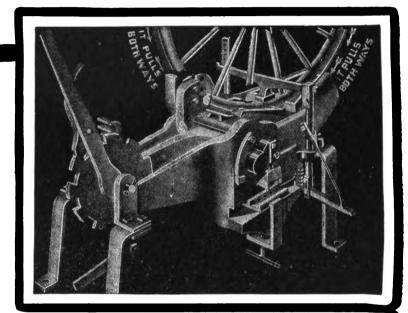




THE—HOUSE

COLD TIRE SETTER

T is a marvelous success. Hundreds of smiths have already gotten comparatively rich by using them, and thousands of others have made good money with them.



And why not, for a man can take in Fifty Dollars in a day on one. Or one man can set as many tires in a day on one of them as eight men can the old way. If you had the work on hand to do at one time you could take in the price of the machine in three days. Consequently, you see it only costs you the price of three days' time, as it does the work at that rate even if you do not set them all at one time.

And as money was scarce last year and there were but few new wagons bought so there will be lots of repair work this year. And besides, the seven wet years are past and the seven dry years have come at last, so you see there is a double reason why you should order at once and be ready for the harvest.

Now, is it a fact that you will hesitate to order because you can set them the old way, and just hate to get out of the rut and undertake to learn to set them the new way?

If this is your trouble, we can help you out, for our machine sets tires just like the old hot setters, and they are just as simple and as easily worked. They simply grip the tire on the edges and shrink it right on the wheel cold.

And besides, ours is the only cold tire setter that has a shear and punch, and our shear is a "Gem." Altogether, our machines are the best in the world, and the proof is in the fact that we have ten times as many in actual use as there are of any other make.

They are sold cheap and on easy terms. WRITE US TODAY.

HOUSE COLD TIRE SETTER CO.

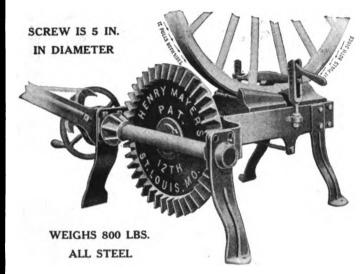
216-218 S. Third St., ST. LOUIS, MO.

J. F. HOUSE, 201 Church Street, TORONTO, ONT., CANADA

Mayers Tire Setter Mfg. Co. Announce!

The "Only Cold Tire Setter That Pulls Both Ways"

Will be sold this year on SUCH A BASIS that any blacksmith can buy one. Our making and selling capacity has been so increased we are going to give the trade the benefit of it by



GREATLY REDUCING THE PRICE OF THE MACHINE.

You can get one NOW. Our WARRANTY is STRONGER than ever. We not only warrant the machine to "Stand up to the Work," but we warrant it will PAY FOR ITSELF, and let you

TRY IT FOR ONE YEAR TO PROVE IT.

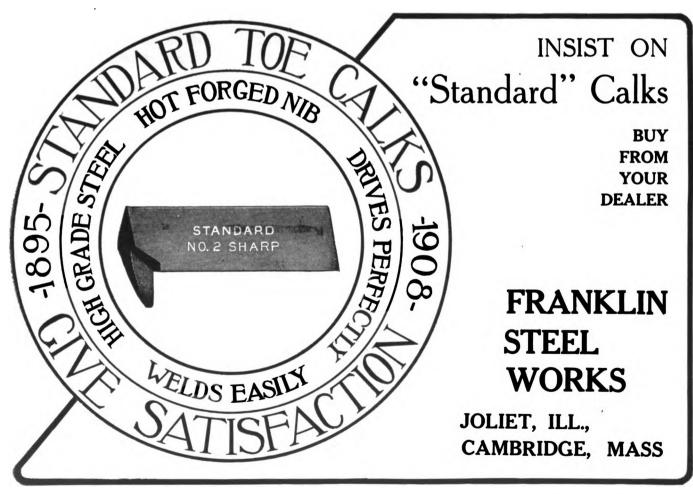
Write today for full particulars—It's the fairest, squarest proposition you ever saw.

Whether you intend to buy or not, it will be interesting for you to see how just this offer is, both to us and you.

MAYERS TIRE SETTER MANUFACTURING CO.

4028 - 30 Forest Park Boulevard

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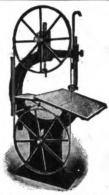


THE FAMOUS

CHICAGO LINE

Wood Working Machinery

DESIGNED especially for blacksmith and wagon shop equipment. We show only a few of our machines here, selected from our big, complete line. Write for circulars and net price list. Describes in detail all of our machines. Mention The American Blacksmith. WRITE TODAY. Come in and see us when in Chicago. Over 600 machines exhibited.



Chicago 27, 32, 36 in. Band Saws.

CHICAGO MACHINERY EXCHANGE

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EXCLUSIVE REPRESENTATIVES

Baxter D. Whitney & Son C. O. & A. D. Porter Hermance Machine Co. McDonough Mfg. Co. Greaves-Klusman Co.



ECCLES BALL-BEARING COUPLINGS

The cut shows our coupling bolted to axle, and the form on flat leather bushing takes, when the shafts are placed and locked in the coupling. The leather can be securely fastened in by the user, by driving a soft wire nail through the small hole we drill, which clinches it.

When the shafts are removed, the bushing does not come out, but stays in the Coupling where it belongs. NO LOST BUSH!NGS WHEN YOU USE OUR COUPLINGS.

We would like to send you our circular and have you try our Couplings. They will save you money.



Patented Nov. 25, 1902.

The Spring is pivoted at the front so that it can be turned forward out of the way of the wrench while clipping the Coupling to the axle.

These are two of the good points, but there are plenty more desirable features in our Couplings.

We also have a Catalog showing our full line of Carriage and Wagon Forgings all of which we make.

RICHARD ECCLES CO., Auburn, N. Y.

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YOU CAN

Lower Your Cost, Improve Your Work and Do What You Cannot Do Now.

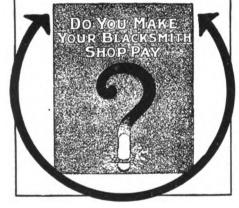


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The number who requested a copy exceeded our expectations. So many compliments have been passed on this book that we feel sure you will appreciate having it. You know our facilities enable us to quote the very lowest prices on such goods as poles, shafts, wheels, seats, bodies, gears, and similar vehicle material. Perhaps we can furnish you such repair parts as you need at a lower cost than

We are also prepared to ship promptly any orders entrusted to you can build them yourself. our care. Won't you let us send this useful little catalogue to you? It may be just what you have been looking for.

PARRY MFG. CO. INDIANAPOLIS,



TOPS, SLEIGH BASKETS, ETC.

Send for our 1909 Catalog, just out. It will interest you from a POCKET-BOOK standpoint.

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500,000 "Always Sharp Calks"

to sell to Blacksmiths, any size from 5-16 to 9-16 at \$1.20 per 100 f. o. b. Harrisburg, Pa.

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The Wizard Adjustable Ratchet Wrench



Is the first and only practical, adjustable ratchet wrench ever placed on the market. A quick acting, timesaving wrench. All parts drop forged, ad-

justable hardened jaws, right or left action. Jaws open to take any size nut up to one inch. Wrench is 8 inches long. If there is a nut on your auto or engine where no other wrench can be used the WIZARD will do the work. A valuable

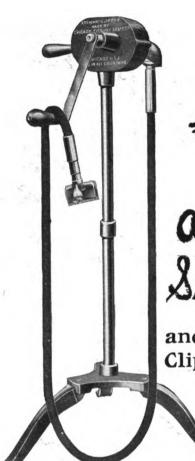
tool for automobilists, engineers and mechanics. Absolutely guaranteed. The Wizard Adjustable Ratchet Wrench is the handiest tool in the world. Write Wizard Adjustable Ratchet Wrench is the handlest tool in the world. us for descriptive circular and prices if your dealer does not carry the Wizard. WRITE TODAY.

THE RICHARDS MFG. COMPANY, Aurora, Illinois

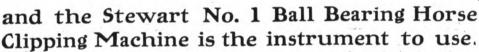


The Stewart No. 1 Clipping Machine at Work.

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Should be Chipped and Blacksmiths Should Clib Them



Clipping Horses is the legitimate business of the Blacksmith. A small number of jobs will pay for the entire investment (A Stewart No. 1 at \$7.50) after that its all **profit**. The field of operation is your locality and every horse owner is your prospective customer.

Don't throw opportunity out of the window when it comes in at the door.

Get in line for business, and *prepare* for more business by installing a Stewart No. 1.

Here's Reasons Why.

Every horse needs clipping and here's why. Clipped horses look, feel, work and sleep better than unclipped horses, and can be cleaned in one-fourth the time. Money spent in clipping horses is money invested because it prolongs their life and enables them to give better service.

As a duty to their business, blacksmiths should specify—and demand—our machines. The difference in price between Stewarts and cheap, trashy imitations is so insignificant that obtaining an imitation is economizing **upside-down**. Think it over.

The Stewart No. 1

is without question the only machine on earth that is particularly fitted for blacksmiths' use. Under any and all conditions it is positive in action and always reliable.

The principle of the Stewart is unique and the manufacture is perfect. The gears are cut from the solid steel bar and made file hard. All are enclosed, protected and swim in oil so that friction and wear are practically eliminated.

The six feet of high grade flexible shaft, that accompanies each machine, enables every part of the horse to be reached. Knife is the Stewart one-nut pattern—world famous for its simplicity and perfection.

\$7.50 is for the machine complete, F.O.B. Chicago. But you need only send \$2.00 with order and machine comes C.O.D. for balance. Get it from your supply house if you wish.

Catalogue and full literature immediately follows your request. Write us.

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A Carbonizer which is positive, accurate, uniform and speedy

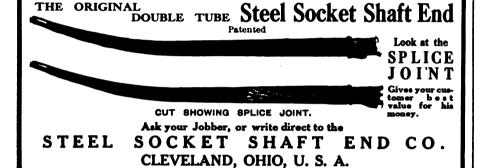
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Five Punches and Five Dies with each Machine.

One man on the lever cuts $\frac{1}{2} \times 4$ inch, punches $\frac{5}{8}$ in. hole in $\frac{1}{2}$ in. iron, and cuts I in. round iron. One operation of the lever does the work. No changing required.

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Extra Punches and Dies 50c. each and Guaranteed.

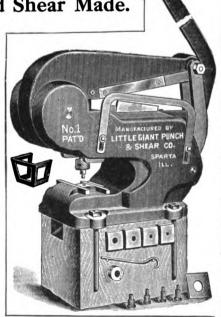
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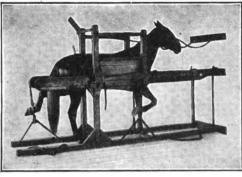


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Strong and Durable, Will Last a

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Shoes The Most

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in 20

With these stocks the most visious horse can be shod in twenty minutes without any risk to man or beast. When not in use stocks fold against the wall and occupy practically no room. Our shoulder rope secures the horse instantly so that he can't get away. The horse cannot lie down, rear or pull back with our fastenings. The feet are held firm and taut by a flexible mechanism; no dangerous vise-like foot hold; impossible to injure or break a horse's leg. Two feet can be shod at the same time. Quick and easy to operate, easy on the horse and no strain on the shoer. In releasing horse you simply pull a lever and the sling drops from under him. These stocks have been tried and tested for years, and are used by the United States army. Write for descriptive circuiar, price list and testimonials. Terms and prices liberal. You do not pay for the stocks until you have thoroughly tested them to your own satisfaction.

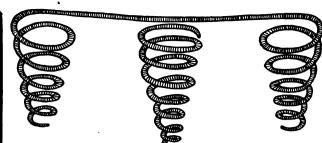


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COUPLING
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IT WILL TURN OFF
BLUE CHIPS ON ANY KIND OF WORK.



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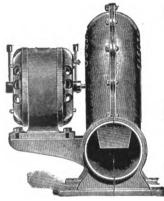
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SHOD WITH THE

CELEBRATED "CAPEWELL" NAIL

THE CAPEWELL HORSE NAIL CO., Hartford, Conn.

Nov. 30, 1908.

Dear Sirs:

It may interest you to know that I shod Allen Winter for all his races and speed tests during the season of 1908, including the famous \$50,000 handicap race trotted at Readville, Mass., August 25th.

This particular race is said to be the greatest race in trotting turf history. A loose shoe in that race would have caused the owner of Allen Winter to lose instead of win \$30,000.

Notwithstanding the tremendous strain which comes on nails holding the shoes of a race horse, and that Allen Winter is a heavy horse (shod in front with 8-oz. bar shoes with heel and toe grabs, and behind with 5-oz. swedge shoes) I have always found that he can be safely shod with your No. 4 and 4 1-2 nails.

Your nails have always given me perfect satisfaction and I am certain that I have never seen a horse nail which has so many fine qualities as the "Capewell."

Yours truly,

(Signed) F. J. GOODWIN.

"Capewell" Nails Hold Horseshoes Under the most trying strains in all kinds of service.

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The Largest Manufacturers of Horseshoe Nails in the World.



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THE QUALITY MAKE

Recognized as best by experienced vehicle men everywhere.

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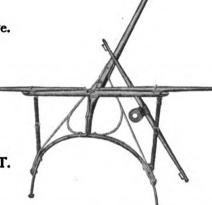
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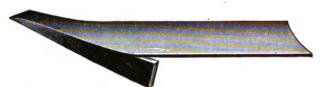
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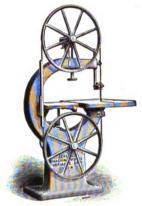
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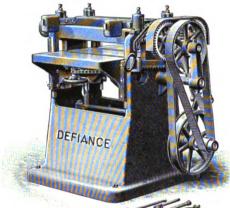
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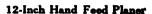
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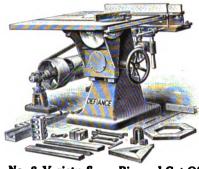


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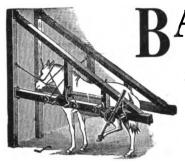
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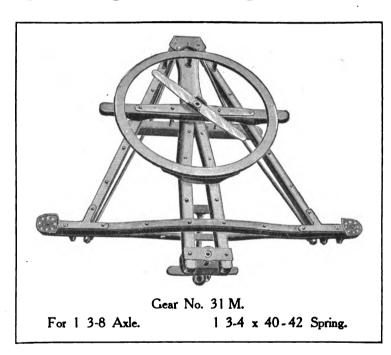
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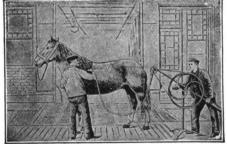


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The Guarantee we give you with our Machine is as good as a U. S. Gold Bond.

We are so far in advance of other machines in improvements that we really have no competitors. Gillette Machines give satisfaction in every way.

Our claim is as broad as words can make it. The Gillette Clipping and Grooming Machine is better than any other Clipping and Grooming Machine in every particular.



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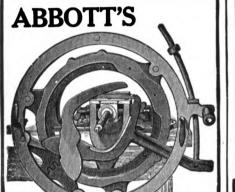




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Little Giant Hub Borers AND Abbott's Box Puller

Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers' Machinery.

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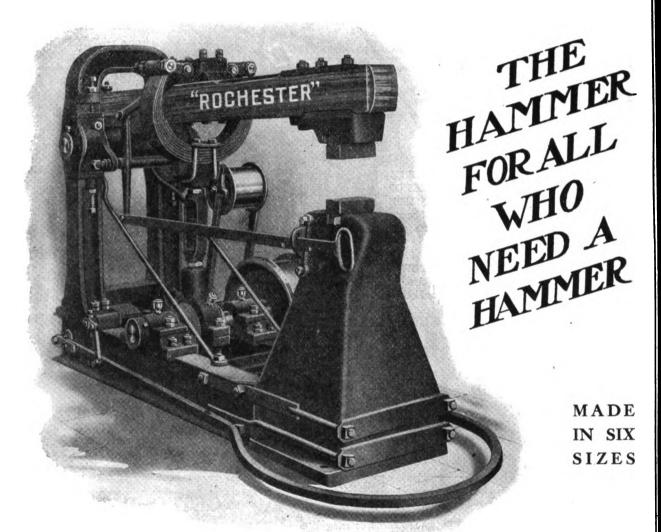
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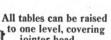
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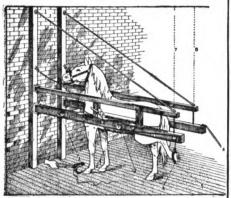
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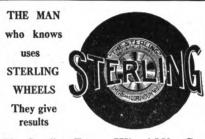
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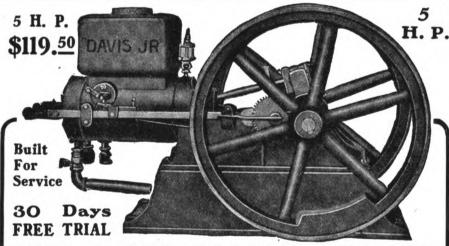


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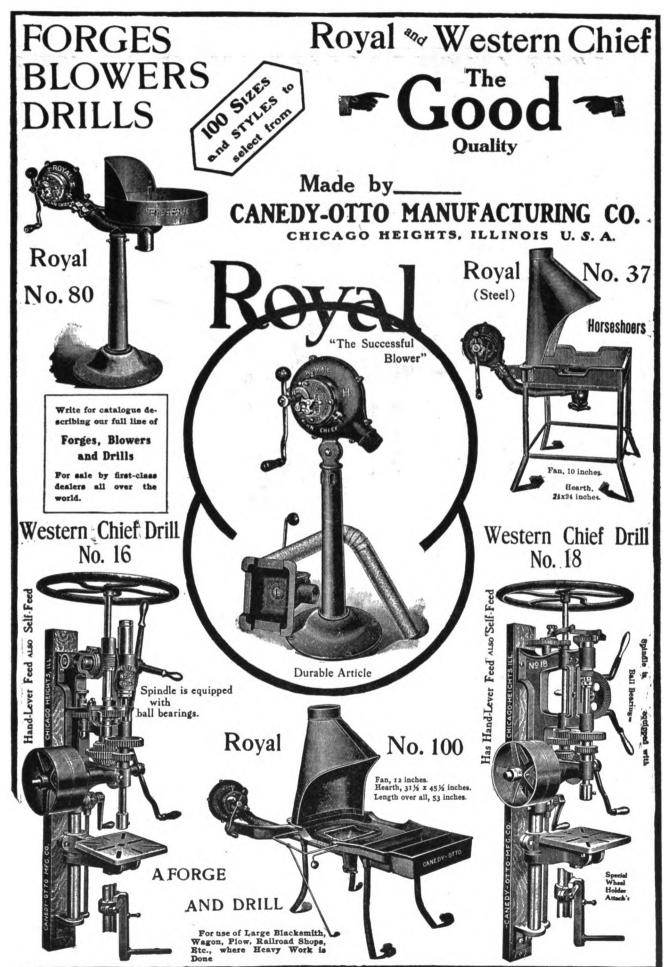
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Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in American Blacksmith advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

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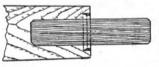
If you will examine and compare, piece If you will examine and compare, piece by piece, you will say there is no other quite so good as the "BAUER." All sizes from 2 to 50 H. P. Write at once for free catalog, containing long list of letters from satisfied users. Our prices are also very interesting, considering quality. The First Blacksmith in any town who buys of us gets the agency for his locality, a discount on his purchase, and a commission on his sales. A good engine sells readily.

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GWT

TO all you good Blacksmiths and Repairmen who have been using the PIONEER SHAFT ENDS, we extend the hand of good fellowship and best wishes that the year 1909 will bring you lots of prosperity and happiness. As for those blacksmiths and repairmen who are Shaft End users and are still laboring under the belief that another kind is just as good as the PIONEER, we hope they will also be happy and prosperous, brought about partly by a good New Year's Resolution, that their next order to their jobber will specify PIONEER SHAFT ENDS, made by

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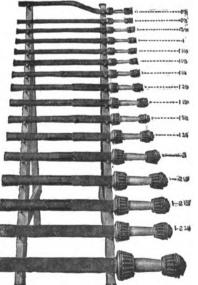
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Subscribers should notify us promptly of non-receipt of paper or change of address. In the latter case kindly give us both the old and the new address.

About Our Journal.

This January number will go to some craftsmen who have never before seen a copy of The American Blacksmith, and it is therefore very much in order for us to say something about "Our Journal." Every issue of the paper contains the same number of reading pages as this one does; no trade puffs, stale clippings or matter of similar low standard is allowed. Our writers and regular contributors are authorities in their respective fields. They are giving "Our Folks' the value of their experiences every month—are giving them hints, kinks and instructions on work that it has taken them years to learn at first hand. As G. H. Richardson, of Tennessee, says, "The paper is worth \$10.00 a copy—I would not do without it."

The American Blacksmith brings the craftsman into closer touch with a better knowledge of craft matters. It acts as an introducer to larger success and bigger opportunities; it solves the smith's daily problems; it gives him the practical moneybringing information that can be applied today on today's job. It gives you once a month, twelve times a year, not less than twenty-four pages of good, solid, practical craft information; not the social news, nor the political news, nothing but practical, usable craft news.

Advertisements.

There are a lot of advertisements these days that you do best not to answer, but you will not find them in the columns of The American Blacksmith. Our Pink Buffalo Protection Stamps and our Honest Dealings Paragraph insure this. They insure you against the unfair business houses. They show the swindler that we are ready to use "a big stick' on him if he doesn't treat you honestly. So use the little pink squares freely and ask for more when your supply is low. If you are not familiar with the protective insurance offered to subscribers of "Our Journal," ask about it.

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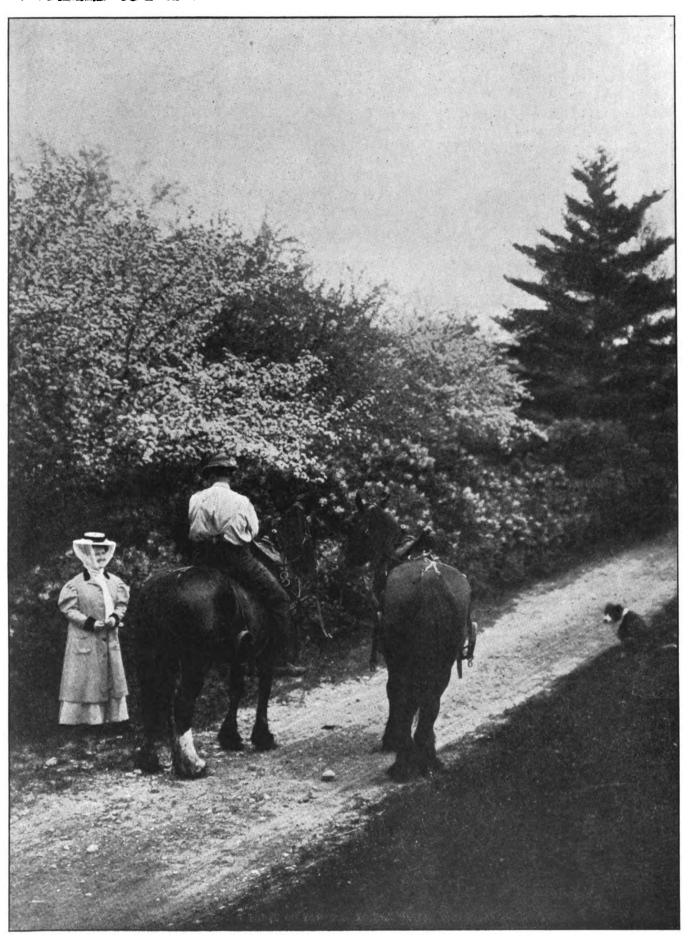
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The Column of Opportunity.

Did you know that at the rate of twentyfive cents per line you can talk to a larger number of smiths than is reached by any other publication? Did you know that our want columns present an opportunity that you cannot afford to overlook? If you want to sell your services, your business or any part of your equipment, if you want a helper, a shop or a second-hand machine our want columns will help you. The small cost is no indication of the value in this instance. An announcement in our wanted and for sale columns gets the attention of the biggest family of smiths reached by any publication. And the cost of twenty-five cents a line is as nothing compared with the audience. Try the want column with a test advertisement.

Machine Shop Practice.

For some time we have been searching for a man who could give our readers just the information they need in machine shop practice, but, until now, our search has been fruitless. Men competent to write on the subject of machine shop work are plentiful, but to find a man who could write on the subject and see it through the eyes of the smith was especially desired. Now we have found the man we wanted and at an early date—a very early date—we intend to give to "Our Folks" just the information they need on the subject of machine shop practice. Readers are invited to ask questions on machine shop work and it is hoped that those interested in the subject will be benefited materially through the reading of this new series of articles. There are lots of our readers who have some article of machine shop equipment in their shop, and it is for these that this new series is especially intended Then, too, there are some who would put in one or two machine shop tools if they knew how to operate them. To these readers this series will open a new avenue of profit.



A PAUSE ON THE WAY TO THE SMITHY



THE OLD SHOP BEFORE THE BUILDING OF THE ADDITION

Planning the Smith Shop

NELS PETERSON

COMEONE said at one time: "Plan your work then work your plan." But just as important is the planning of the place where the work is to be done. Never before has so much attention been paid to the planning and laying out of the shop, the factory and the manufacturing plant. Every side of the question of economical output is looked upon and considered. While a few years ago little or no attention was paid to the planning of the smith shop and the placing of machines, the keen competition of the present day demands that these matters receive full consideration. No longer is any old building considered good enough for a smith shop. The modern smith shop building must be more in keeping with the skill and ability displayed in it.

Perhaps one of the most important features to be considered in the planning of a smith shop is the lighting. If the light in the shop is insufficient the men cannot work in comfort, cannot do their work properly and, what is most important, will injure their health. It is therefore important that plenty of

windows be allowed in the plan to provide an abundance of light. Then there is the matter of ventilation, which is important. A thick, smoke-filled atmosphere is not only unhealthy but is not conducive to a worker's best efforts.

Then there is the feature of roominess. Allow plenty of room for each machine, forge and anvil. It is impossible, except at some cost, to move a forge after the building has been erected. Better too much space between fires than not enough. The placing of engine foundations and the foundations for other heavy machines and tools should be carefully considered. There is a liability toward too little room rather than too much, and where a machine is crowded the best of work cannot be gotten out of it.

The several matters to be considered in planning a shop are almost number-less. Then, too, there are special questions that apply to each particular case. The location, the kind of work to be done, the trade to be supplied and many other matters will have a bearing on your plans.

As an example of shop planning the

accompanying engravings are shown. These are plans for an addition now being built to the present shop of A. Murphy & Son, of Omaha. The front half of this new building will be an exact duplicate of their old shop, which for some time has been entirely too small for their needs. The entire lower floor of the old shop is to be devoted to the shoeing department, while the new building will house the blacksmith shop, the wood-working department and the office on the first floor. The second floors of both the old and new buildings will be used as a paint shop and a repository.

From the engravings it can be seen that all departments are well lighted. The windows are large, well placed and of goodly number. The front of the lower floor, as may be seen in the front elevation, is made up almost entirely of windows, while the second floor front contains six large windows. These, with the ample window space shown in the elevations, should provide plenty of natural light for the men.

As indicated in the plan of the first floor there will be four fires located along the east wall of the front half of the new shop. These forges will be fifteen feet apart from center to center of firepot, with anvils and vises at convenient distances. There was some discussion of placing the fires along the middle of wood shops are to be placed along the west wall, except such machines as are in use at the forges. The line shaft will be run along close to the center of the shop through both departments, so that power can be transmitted to a machine inches, J=20 inches, H=18 inches, F=12 inches and K=10 inches. To find the number of revolutions per minute which shaft D makes multiply the revolutions per minute of shaft A by the diameter of pulley E and divide



FIG. 1-SHOWING SIDE ELEVATION OF THE NEW BUILDING

the shop, but after considering this from every point, the idea was abandoned on account of the large floor space, so necessary in the carriage shop, which would be taken up. About the only advantage derived from having the fires out in the shop is to be had when handling long pieces. These are generally few and far between in the carriage shop, so that the value of the space will more than offset this advantage. Then, too, when necessary, a little ingenuity will enable a smith to handle the occasional long piece in the fire properly and to move and arrange his anvil according to the work.

The rear half of the ground floor will be used as the wood shop. Owing to on either side without having to carry the belts over countershafts and pulleys for too great a distance. It is not always possible to make connections direct from the line shaft to the machine, as it sometimes happens that a pulley on a line shaft cannot be located so as to give the desired speed. Furthermore. a long belt when stretched slanting across the shop takes up too much room and is dangerous. In such cases a train of pulleys must be used to obtain the proper speed. And in this connection it might be of interest to know how to figure speed in such cases. Fig. 4 shows a train of pulleys with three drivers and three driven pulleys. Shaft A drives shaft B by means of pulleys E and H; the product by the diameter of the pulley H, which is 100 multiplied by 36÷18 which is 200. In like manner multiply the revolutions per minute of shaft B by diameter of pulley G and divide the product by diameter of F, which is 200 multiplied by 24÷12 and equals 400. The revolutions per minute of shaft C multiplied by diameter of pulley J and divided by diameter of pulley K is 400 multiplied by $20 \div 10$, which is 800 revolutions per minute of shaft D: or simply multiply the revolutions per minute of the line shaft by the product of the diameter of the drivers and divide the product thus obtained by the product of the driven pulleys. In this case it would be 100 multiplied

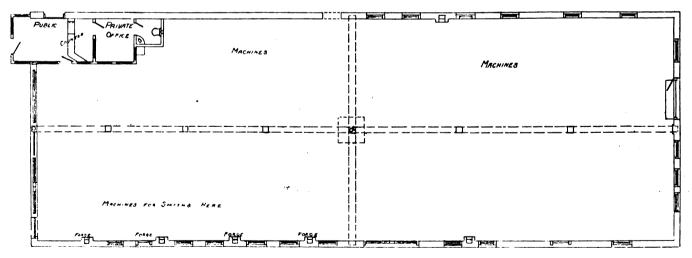


FIG. 2-SHOWING THE FLOOR PLAN OF THE NEW SHOP

the great amount of heavy work built, a track will be suspended from the joists so that a heavy body, when finished, can be transferred to the smith shop with little trouble.

The machines for the blacksmith and

B in turn drives C by means of G and F, and C drives D by pulleys J and K. Now let us suppose that the line shaft A makes a hundred revolutions per minute. The pulleys are of the following diameters: E = 36 inches, G = 24

by $36 \div 18$ multiplied by $24 \div 12$ by $20 \div 10$, which is 800, using the drivers as numerators and the driven pulleys as denominators.

In all cases where the shafts are parallel and turn in the same direction



FIG. 3—THE FRONT ELEVATION IS A DUPLICATE OF THE OLD SHOP FRONT

a straight open belt can be used, but in many cases it is necessary to have two pulleys, connected with the same belt, turn in opposite directions. To accomplish this a crossed belt must be used, as shown in Fig. 5. A belt cross in this

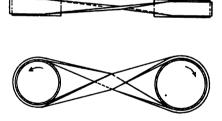


FIG. 5— THE PULLEYS RUN IN OPPOSITE DIRECTIONS

way, is necessary when the pulley on the machine or countershaft must turn in opposite direction to the line shaft.

It sometimes happens when setting machinery that the shaft on the machine is at a right angle to the shaft driving it. The belt used in such cases is termed a quarter-turn belt, and the pulleys on the shafts must be so located that the points where the center line of the belt leaves a pulley must be in a straight line with the center of the face of the pulley to which it is running, as shown in Fig. 6.

A closer study of the figure will show that point A is vertically over point B, i. e., the leaving sides of the pulleys are in the plumb line. With this arrangement the shafts must necessarily turn in the same direction, for if the direction of rotation is reversed neither pulley will deliver the belt into the center plane of the other pulley, and, consequently, the belt will not stay on.

Welding and Handling Flues. JOSEPH NORTHEND.

Our flue welding is done in the boiler shop and we are not really interested in the work. The flues are sent from the machine shop to the flue rattlers, which are just outside of the shop. Four men handle them on a three-wheeled cart of our own design. About one hundred and fifty are put in each rattler and allowed to remain for nearly ten hours.

Our next operation is to cut off the ragged end, this is done cold, by a cutter revolving on the flue. We then heat the end to be welded in the furnace and when hot it is brought out and jammed on a mandrel which flares it out. Then the new end is placed on the mandrel and the flue is jammed onto it. We then take a welding heat and this is

The furnaces we use are of our own design and construction, each furnace having three parts for heating purposes and each part is just large enough to heat one flue. We use oil for fuel and direct blast on the furnaces. Our swedging machine is also of our own design and construction, it having an air cylinder to operate it. The piston is connected to the upper die, the lower die being stationary. In the dies is a hole the size to which the flue is to be swedged, and by stepping on a foot lever

welded by rotary welding machine having a speed of 230 revolutions per

While yet hot the flue is

minute.

swedged.

The new ends which we use are beveled and we are now constructing a machine which will grind these ends immediately before being used. Although we have not used it we think it will help us

the upper die closes down tight on the lower one, thus squeezing the flue.

materially in the swelling.

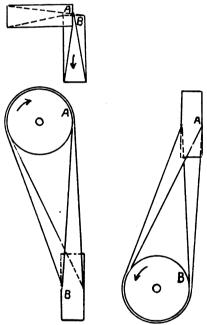


FIG. 6—FOR PULLEYS RUNNING AT RIGHT ANGLES TO EACH OTHER

Now as to the cost of our flues and the production, we pay for welding and swedging only 36 cents per hundred and for welding only \$1.35 per hundred. Of this size one man can weld and swedge between three hundred and fifty and four hundred per day. For the 2½-inch we pay \$2.10 per hundred for welding and swedging and for three-inch we pay for welding and swedging \$2.45 per hundred.

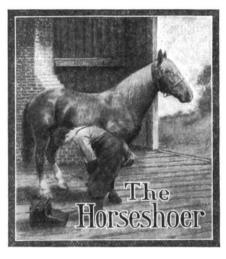
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FIG. 4—SOMETIMES A TRAIN OF PULLETS IS NECESSARY

Flue Work.
Per 100.
Cut off. \$.30
Scarf. .45
Welding. 1.00

Swedge and anneal \$	1.00
Safe ends cut	.30
Safe ends scarfed	. 20
Rattle	. 30
Opening flued	. 15
	. 20
Marking	. 20
Haul from erecting shop to	
rattler	. 33
From rattler to flue plant	. 50
From flue plant to erect-	
	. 50
ing shop	
From roundhouse to rattler	. 50
From flue plant to round-	
	0.0
house	. 66

Total cost per hundred flues, \$6.39



Mutton tallow as a salve for healing up cuts and large punctures in the foot is unexcelled. It is excellent for growing new hoof where the horn has been cut away and will give excellent results whenever used.

J. L. E., Illinois.

Salt for the treatment of deep cuts, hoof rot in cattle and for punctures similar to that described by Mr. Lindsey in the October paper, page 4, is much better, easier to secure and safer than the majority of treatments recommended which are more or less poison. Then, too, salt will work up into all cracks, fissures and diseased parts quicker and more satisfactorily than most other antiseptics. In use simply pack slightly dampened salt into the cut or puncture and bandage for twelve or fourteen hours or until all disease or rot has been arrested, then wash out and apply a healing ointment or salve. W. F. T.

Fitting the Shoe to the Hoot Versus the Hoof to the Shoe.

E. W. PERRIN.

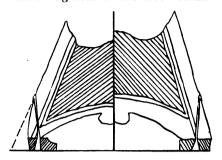
As long as horseshoers continue to fit the hoof to the shoe this subject will remain the most important phase of the horseshoers' art. Since the advent of trade journals and schools of horseshoeing, there has been a marked improvement in the standard of the work performed, and this is especially true in the few states where the horseshoer must pass an examination before he is permitted to operate a horseshoeing business. But this law insures the competency of the master only, it does not compel the owner of the shop to

employ none but graduate mechanics. Of course, the master, being a graduate himself, would obviously employ the most competent labor at his command, but the trouble is that there is no comprehensive system of apprenticeship in the trade of horseshoeing. In a few states there are good schools of horseshoeing, but in the majority there are none, and even where there are schools there is no law to make the embryo horseshoer attend them, even apprenticeship to the trade is not compulsory.

As a result of this lax, haphazard way of doing things the vast majority of horseshoers have not the advantages of schools of scientific horseshoeing, and the majority who have the opportunity do not embrace it because an examination as to competency is not compulsory.

The vast majority of horseshoers just "pick up" their trade without any systematic study. Some of a studious disposition take to reading. They combine the theoretical branch with the practical part of their trade, they reinforce the work of the hand with the brain, and as a result become efficient,

is rasped this superficial layer of horn is destroyed, the horn tubes are laid bare and as a result of the loss of this protection, evaporation takes place, the hoof becomes dry and brittle, and shrinks—tightens on the foot within.



FIGS. 1 AND 2, SHOWING HALF CROSS SEC-TIONS OF CORRECTLY AND INCOR-RECTLY SHOD FOOT

Since the wall of the foot never grows too thick, except under the abnormal conditions of injuries, neglect or disease, it never ought to be thinned by rasping its outer surface, except in the special cases above referred to. (See Figs. 3 and 4.) But even in these special cases the surplus growth of hoof to be removed



AN OLD BUTTRESS USED SOME 150 YEARS AGO BY JABEZ WAITT, OF LYNN, MASS. PUB-LISHED THROUGH THE COURTESY OF MR. WAITT'S GRANDSON, NOW 82 YEARS OLD

skilled, scientific horseshoers. But there are thousands of men working at horseshoeing who have never read a line on the anatomy, physiology or pathology of the horse's foot on which they work every day, and, being ignorant of the scientific branch of their trade, they do not realize the importance of fitting the shoe accurately to the hoof.

Some evils resulting from fitting the hoof to the shoe superinduces contraction of the hoof. The wall of the hoof is composed of innumerable small horn tubes descending from the coronet to the plantar surface and are held together in a solid compact mass by gluten, thus forming a tough and, to some slight degree, elastic hoof. The outer surface of the wall is covered with a thin semitransparent layer of horn, the fibers of which run around the hoof at right angles to the fibers of the wall proper, which is secreted by the coronary cushion. When this superficial layer of horn is left intact the hoof shines as if it had been oiled. When the outer wall

should be done in preparing the hoof for the shoe (before the shoe is fitted), not after it is nailed on.

Fitting the hoof to the shoe (see Fig. 1) diminishes the circumference of the plantar surface of the foot, which tends to make the foothold less secure. Again, ninety-five per cent of the injuries resulting from pricks in shoeing are the result of fitting the hoof to the shoe.

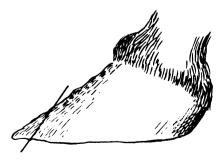


FIG. 3-SHOWING A LAMINITIC FOOT

The first thing which attracts our attention in pricks in shoeing is how very thin the wall of the hoof is. It is then

that the truth is thrust upon us, viz., that if the wall had been a little thicker the accident would not have happened. The illustration (Fig. 1) is not exaggerated, it is common to see many hoofs in the horseshoeing shops of today with the wall so thin that there is not more than one eighth of an inch outside the white line, which indicates the position of the sensitive laminae; what wonder that under such conditions so many horses are pricked in shoeing.

The apologist of this pernicious practice will tell you that it does not hurt to rasp away a little of the wall of the hoof in clenching up; yes, but this little is repeated at every shoeing, in other words, it is common to rasp away from one sixteenth to a quarter of an inch



FIG. 5—THE CORRECTLY SHOD FOOT

of the wall twelve times a year. The wall of the average hoof is about one half of an inch thick. It grows down from the coronet to the ground surface

at the rate of about three eighths of an inch per month, and it takes from nine to twelve months to grow a new hoof complete. If, then, the wall is one half an inch thick, and the horse is shod once in each month, and you rasp away merely one sixteenth of an inch at each shoeing, then in six shoeings you will have reduced the wall at its ground surface (just where you have to drive the nails) to one sixteenth of an inch thick.

Suppose you were asked to drive a nail into the end of a board but one eighth of an inch thick, with

hold enough to secure an iron shoe in place, and yet not bulge the wood on either side? Would not this be almost an impossible task?



FIG. 4-SHOWING SECTION OF WINGY FOOT

Yet many horseshoers rasp away a little of the wall at every shoeing until it is so thin at the base that they have to perform this difficult task. If he does not take sufficient hold the wall splits away and the shoe is loose. If he drives it but one thirty second of an inch too close the wall bulges to the inside or even punctures the vascular living structure. In either case lameness is the inevitable result; whereas, if the wall had been left as thick as nature made it (See Fig. 2) there is little or no danger of pricks in shoeing. The fact is that every time you rasp away the outer wall you are rasping away good hoof which you will need to nail to at subsequent shoeings. If the edges of the wall are ragged, or "wingy," this much should be rasped away, but, I say again, this is to be done before the shoe is fitted, not after. When the shoe is nailed on, all that should be done is to turn the clenches (See Fig. 5).

Now, a word of advice to the up-todate horseshoer: Have a large sign made, a duplicate of Figs. 1 and 2, have put on the top, "No foot, No horse," Put beneath the diagram, "I fit the shoe to the hoof, not the hoof to the shoe." Then live up to that sign in your every-day practice. The wide-awake horse owner appreciates skill, he'll be quick to recognize your ability. It will get you business and benefit man's best friend, the horse, at the same time.

A Substitute for the Bar Shoe.

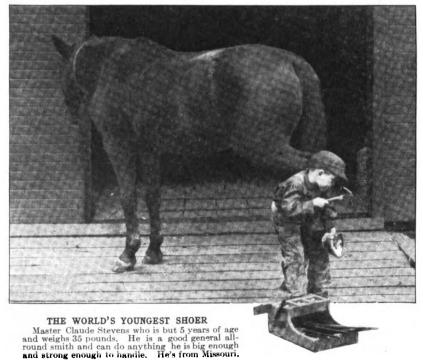
We all know that a bar shoe is worse than useless, unless it is fitted properly, but fitting a bar shoe properly is not as easy as it looks. A good many young fellows have not had the chance to fix



FIG. 6-THE INCORRECTLY SHOD FOOT

a bar shoe, but they are called upon suddenly to use one, and very likely they nor nobody else knows that he did not actually hurt the horse. The other

day I was very busy and got a horse to shoe that travels rather tender and was told to put leathers under in As I did not front. believe that leather alone would do it but that a bar shoe should be used, and I did not have the time necessary to put on a regular bar, I did the following: I cut my leather pad after I had an ordinary flat and open shoe fitted and then attached to the pad two strips of leather, one inch wide, with two copper rivets. where my bar should have been on a bar shoe. The two strips I put on so as to

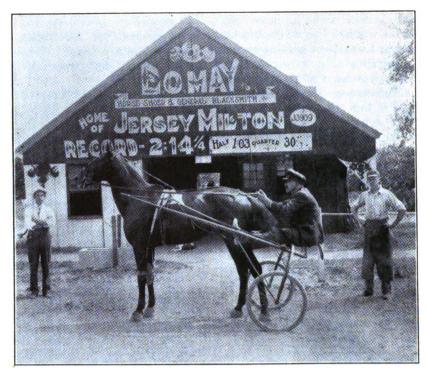


between the two branches of the shoe and to be the same height Now, I do not say as the shoe. that shoes of this kind will put bar shoes out of use, but I believe that in many cases a shoe of this kind will be a good substitute. It has the advantage of being cheap for the horseshoer to make and put on, and it will not hurt the horse if the bar is not put on in exactly the right place. Now, I am not putting this down as a universal remedy for ills where a bar shoe should be used, but am trying it as a substitute. Perhaps some brother will try it and let us hear from him as to results.

I do not believe that this shoe, as described, will be practical where high heel calks are used, as this would call for too much leather and in wet weather this would very likely cause the bar to tip backward. But, on an ordinary shoe without heel calks and only one or two thicknesses of leather, I believe it will do far more good than an improperly fitted bar shoe.

An Ohio Smith's Racing Stallion.

The accompanying engraving shows Mr. E. O. May's black racing stallion, Jersey Milton, 2.141, with Mr. May's shop in the background. Mr. May does a general smithing business, but makes shoeing a specialty. He is shown at the



MR. MAY'S RACING STALLION, JERSEY MILTON, $2.14\frac{1}{4}$

extreme left of the engraving. To the right is Mr. Asa Norton, wearing the "badge of the trade," while Mr. H. B. Cushing, the trainer of the stallion, is in the racing seat.

Jersey Milton 33909, sired by Jersey Wilkes, by George Wilkes, dam Min-

netta W., by Wilkes Boy, by George Wilkes. "Jersey Milton," says Mr. May, "though but a young horse, is showing wonderful speed. His kind disposition causes him to be admired by all horsemen as well as his owner."

In speaking of the performances of his charge Mr. Cushing says: "After thirtysix years' experience at training and driving trotters and pacers I think Jersey Milton one of the grandest horses I have ever trained. At Greenville he met the very best horses in the state, Arthur J., 2.073 and Put, 2.111, and beat them both in the first heat. This is a wonderful performance for a horse that had fifty-one days' work and then raced four heats all better than 2.15. He is one of the best-headed horses in the state. He has speed to burn at a half in 1.03 and the quarter in .301, showing plainly that Jersey Milton with a season's work would take a record of 2.07 or better."

Shoeing Diseased Feet. A. F. LIBBY.

In the healthy foot the center of bearing comes on a line slightly back of the point of the frog. In diseased feet this center of gravity is changed. I should divide the diseased condition of the foot into two classes: first, contraction; second, detraction of the laminae. I should also subdivide each of the above in five or six different classes.

In the first stage of contraction we find an imperfect articulation between

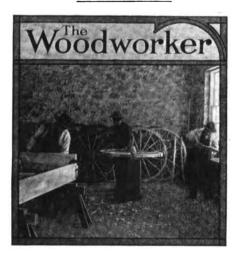


"TIME FOR SHARP CALKS, MR. DRIVER"

the lower pastern and the pedal bone. The pastern becomes nearly upright, thus throwing the weight of the body on the pedal bone back of the normal center of gravity. The raised pastern causes the pedal bone to press on the laminae at the toe. It also causes the sensitive frog to become absorbed, and this causes the foot to contract because it has not its proper work to perform.

I shoe such a foot with a bar shoe, having it rest lightly on the frog and setting the toe calk well back on the web to give the foot a short ground bearing. If the case has become chronic I shoe with a block heel shoe. I do not consider that the block heel shoe is a benefit to the foot, but it relieves the strain at the fetlock and to the tendon which is attached to the lower pastern.

In cases where we have the contraction on one side only I balance the foot as near as possible and use a half-bar shoe. Then scarf the shoe on the contracted side, having the outer edge slightly lower. But if you get it too low you will cause a separation of the laminae. If the shoe is properly applied you will receive good results.

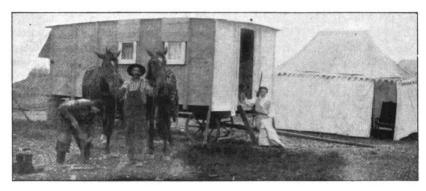


Backing the band saw close to the work being cut is important. That is place the guide arm down near the surface of the wood being cut. This will insure a good clean cut and prevent breakage in a large measure.

S. T. F., New Hampshire.

Glue that will not mold or sour can be made by stirring into glue that has been soaked in the usual way two ounces of borax and one ounce of calcined potash, boiled in one gill of water until dissolved. Hot water is then added to the glue until of proper consistency. G. B. H., Illinois.

To enlarge a quarter-inch hole to three quarters of an inch for half its depth was a problem we encountered the other day. The small hole had already been bored so it was a question of enlarging it to three-quarter-inch for half its depth. We took a piece of round stuff one quarter of an inch in diameter that would just fit into the hole tightly when driven. We then cut



THE TRAVELING SMITH SHOP OF MR. L. E. BALLOU

The car is eight by twenty feet with living rooms in front and shop and tools in rear. Mrs. Ballou travels with her husband and enjoys the novelty. They are located in northwestern Michigan for the winter, but will travel again in the spring.

this piece flush with the surface of the wood, centered it and with a three-quarter inch bit bored out the hole to the desired depth. The small piece of one-quarter inch round stuff remaining in the small hole was then forced out from below. A. B. T., Illinois.

A Properly Fitted Spoke. c. w. metcalf.

In answer to Mr. R. Elmo Harris, who wants to know how to fill a hub so the dish won't go the wrong way, I submit the following. This question is puzzling lots of them of today, especially the new beginner.

For the illustration we will take a 21-inch spoke tapering from top to bottom, i. e., from A to B. I suppose that some people would measure the extreme end or butt to measure a 21inch spoke, but that's not right; your 21-inch measures 21 inches at the arrow's point at C and at the end you will find that it is about 1 inch wider. Now in order to get your spoke to hang right, take your drawing knife and shave off the piece as shown by the dotted line at A, so that the end is 116 inch narrower than it is at shoulder C. But remember that this surplus wood must be taken from the backside and not the face-side. Then use a gauge and drive your spokes so they are straight on the face-side and fit your felloes tight all the way round, except one place, and there leave 1inch opening. Then give your tire 1-inch draft and your wheel will never go back.

A Shop-Made Band Saw.

D. FOSTER HALL.

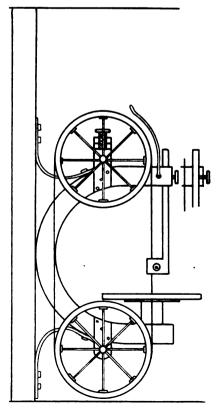
This band saw is simple, strong and easily made. It is not related to the scrap heap in any way, for an article of this kind should be made of good stock and the best is none too good. This machine consists of an upright post six inches square to which is bolted a half section of a three-inch bent rim, $3\frac{1}{2}$ feet in diameter. To this rim is

fastened at the lower end a table twentysix inches square and 1½ inches thick made of three-inch pieces glued together. This table can be made to tilt for sawing angles of any degree. Braces bolted to bottom and top of this rim hold it firmly to the post. These braces should be two by one half inches and curved,



A PROPERLY FITTED SPOKE

as shown. The wheels are twenty-six inches in diameter. The hubs are pieces of three-inch cold rolled stock three inches long with a 1½-inch hole through them. Eight §-inch spokes are used for each wheel with a T formed on one end. The other end is threaded into



NOT RELATED TO THE SCRAP HEAP

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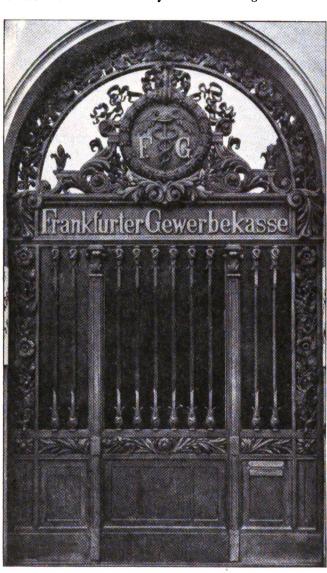
the hub with a good fit. The rim is 1½ inches wide and covered with rubber. Two pieces of iron four by three eighths inches are bolted to sides of rim for holding the wheels in position. The top one is angle shaped with a slot in the side with a screw for adjustment.

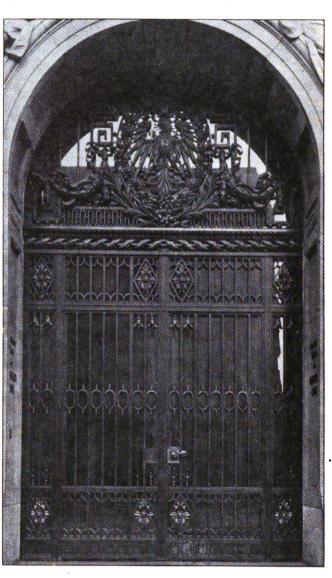
gates are at entrances to commercial houses. They are, of course, excellent in design, composition and execution.

The first engraving shows an excellently composed central figure for the fan light, while the foliage design bordering both the fan light and the gate effectively. The gate as a whole is very artistic.

Forging and Hardening a Hand Hammer. JAMES CRAN.

In making a hammer the first thing to do is to select a piece of cast steel of





TWO HANDSOME WROUGHT-IRON GATES FROM THE PORGES OF ARMBRUSTER BROTHERS, GERMANY

The bearing is fastened to the lower plate and the other end of shaft is held in position by a bearing fastened to the floor. This shaft should be 1½ inches in diameter and two feet long, of cold rolled stock. The power is applied to this shaft and not at the top of the saw as in the case of a similar machine described as a practical article in another monthly magazine.

Two Wrought-Iron Entrance Gates.

The two entrance gates illustrated are examples of the very excellent work produced at the forges of Armbruster Brothers, Germany. Both of these proper is exceptionally good. So close an adherence to nature usually results in stiff, inartistic effects. That is not the case in this instance, however, for the entire length of the foliage is graceful and decidedly artistic.

The other engraving shows a very artistic combination of straight bar work and ovals. The fan light for this gate is well executed. The central figure is well made, while the festoons on either side are very graceful. The gate proper is simple with just enough incidental ornament to keep it from being too plain. The diamond-shaped ornaments are artistic, and with the ovals relieve the straight bar works

at least 0.75 carbon, either round or octagon in section. If the hammer is to be used as a blacksmith's hand hammer material 13 inches in diameter is sufficiently heavy. The first operation is to flatten enough of the bar to form the eye and the pene. After flattening, draw down the portion for the pene to about 11 inches in diameter, if it is to be ball shaped. If it is to be a cross pene, it should be drawn to about the same dimensions square. When this has been done punch a hole for the eye considerably smaller than it is meant to be when finished, as shown at A, Fig. 1. When the hole is punched one side of the eye will be a good deal thicker than

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the other. This is caused by the stock crowding in front of the punch as it is driven in. To overcome this the drift pin should be driven in from the thin

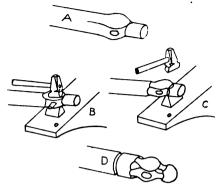


FIG. 1-SHOWING THE STEPS IN FORGING HAMMER

side first and as much of the stock as possible worked back with fullers, as the eye is spread sideways, as shown at B. When the eye has been sufficiently spread on both sides and stands fairly central the sides are then finished smooth with a set hammer and a flatter. The drift pin should be oval shaped and taper, so that the eve will be wider at each end than it is in the center. This helps to keep a hammer firm upon the handle when it is properly wedged. The necks of a hammer each side of the eye are usually octagonal and are fullered to shape, as at C. When this has been done its appearance will be as shown at D. The face and pene can be finished to suit the ideas of the man who is to use it.

Hand-forged hammers are a great deal neater if a little filing is done to true up the octagon necks and to give the edges and sides of the eye a uniform and finished appearance, but polishing is unnecessary as hammers are generally used for work that defaces a fine finish. The face and pene, however, should be fairly smooth and true, so that there would be no danger of marking the work upon which they are used.

To harden and temper a hammer properly is a subject that has been frequently discussed and there still seems to be a good deal of difference in opinions. But the writer will give the method he has followed with success for over twenty years. Heat the pene to a bright cherry, keeping the heat as short as possible by packing fine green coal, that has been well watered, immediately behind the part that is being heated. When the proper temperature has been reached dip in a bath of cold water, where it should be kept until it is sufficiently cooled to carry water on the end. Now polish and draw temper

with back heat until the color is approaching purple, when it should be cooled off or dipped long enough in water to prevent the temper running any lower. When this has been done heat the face in the same manner and as near as possible to the same temperature as the pene was heated, and cool off in a stream rising straight from the bottom of the quenching tub, as shown in Fig. 2. The stream should have just enough pressure to raise the water immediately over it about one inch above the level of the surrounding water. This prevents a cushion of steam forming on the center of the face and insures the center being as hard if not harder than the edges. When the face is fairly cooled remove from water, polish and draw the temper by placing in a hot fire just long enough to draw the edges to a dark blue, leaving the center as hard as possible. This gives a face that will neither chip nor batter down. The writer has a hammer that was made and hardened, as here described, over ten years ago.



Benton and the Editor were earnestly discussing future issues of the paper. "What is the feature of the February issue?" questioned Benton.

"For February, railroad and heavy smith work will receive especial attention," returned the Editor. "Of course, horseshoeing and vehicle work will receive due attention, but several excellent articles on heavy forge work will be featured. The articles will not only be of interest and value to the railroad smith, but will also interest the general smith in that they will tell how some big difficulties are overcome in the large shops.

And for March—?" began Benton. "For March the feature will be a descrip tion of the largest carriage and wagon works in South Africa," replied the Editor. "The article will be accompanied by numerous photographic illustrations of the shops, the buildings, the show rooms, the yard and also the staff employed at this big vehicle works. Mr. R. Symons, the proprietor of this extensive works, has been a reader of our paper for several years and has built up a business of which he may well be proud."
"That promises to be very interesting," said the other. "I always had an idea that

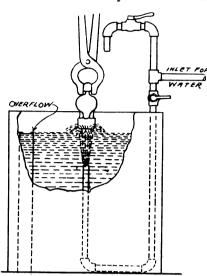


FIG. 2-THE BATH USED TO TEMPER A HAND HAMMER

South Africa was not very much given to big shops and things.

"I guess that's what a good many people think," returned the Editor. "They have an idea that the lower end of the dark continent isn't much more civilized than the interior, but the March issue will surprise these people.

"How about other issues?" queried the Editor's visitor.

'Well, while the schedule for the year is laid out, I prefer not to say, as it is often necessary to change the program for some reason or other. Of course, there will be an automobile number and a horseshoeing Then there is the annual shop number that always proves so popular. Then comes vehicle building, machine smithing, ornamental work and so on down the list. Of course, these numbers will not appear in this order, but they are being arranged for and will appear some time during the year.'

"That sounds like a good program," re-rned Benton. "It promises some interturned Benton. esting and valuable information for readers.

Yes, we're not afraid to give good heaping measure. There's nothing too good for 'Our Folks'; and we are continually on the lookout to add to and improve our satisfactory service to subscribers.

Billy Crompton came in at this point. "Say, Benton," said the newcomer, "you're just the man I want to see. Do you suppose that receipt book of yours could give me a hint on how to waterproof leather?"
"Sure thing!" exclaimed Benton, "and

a good receipt, too. Make a mixture composed of eight parts of castor oil and two parts by weight of raw India rubber. Heat the oil and when at about 250 degrees add the rubber in small pieces. Stir until the rubber is completely dissolved, when it may be poured into a suitable receptacle and allowed to cool."

"That's a simple one and it sounds as though it would be effective, too. In return I want to give you a good way to anneal steel. I came across this some time ago and it proves effective in especially stubborn Cover the steel with fire clay and then heat gradually to a red. Allow the piece to cool over night in the forge and it will be found very satisfactory in the morning."

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A Leap-Year Calendar.

JOHN DONNELLY.

The lady blacksmith, Marey Ann,
Declared she would propose in JAN.
Smith was entangled in her web

And to him she proposed in FEB. He was a jolly roving tar,

And promptly jilted her in MAR.
She tried again with all her skill

But found no beau in APRIL. She plied her hammer day by day

And hoped for better luck in MAY. At her shoeing forge one afternoon

She met Bill Jenkinson in JUNE. She popped the question to that guy

One glorious evening in
And Bill, who was a jolly dog,

Said he would name the day in AUG. His father said, "Don't take this step.'' And so the match was off in SEP.

She donned a stunning silken frock,

And caught a wealthy boy in OCT. He bought an auto, off they drove,

And married were one day in NOV.

The auto tried to climb a tree

And both were killed in D-E-C. Written expressly for the American Blacksmith.



A Happy, Prosperous New Year to every one of "Our Folks."

It's a heap of help to start good, though it doesn't insure a good finish.

The skeleton of the horse is made up of two hundred and forty-two bones.

A snug, tight shop goes a long way toward making one comfortable these days.

He is a failure indeed who admits having reached the limit of his capabilities.

Deeds, not years, are the true measure of one's life. How old are you in deeds?

If you can't help a good cause, don't hinder it. Even that will be some help.

A guess in business is a guess at profits—and a guess is usually as good as a miss.

The man who is honest because it is the best policy will be dishonest for the same reason.

A trade winner is satisfaction. Mix a good, liberal quantity of it with every job you turn out.

'Tis not only economy to buy the best in tools, but to keep them right up to date by careful attention.

"Brush up" on your craft knowledge these long winter evenings. Our book department can help you.

Doing business without advertising is like riding in a wagon without springs—it's pretty tough riding.

An active mind and a finger on the pulse of things will keep a man young, no matter what his age in years.

Nourish your bank account by buying close, selling at a good price and collecting every penny when due.

So loud do some men kick about lack of opportunity that they don't hear Opportunity when she knocks.

If you don't know, read The AMERICAN BLACKSMITH and then try. Tell your neighbor to do the same.

Some smiths are so busy watching their competitors that they haven't any time to watch their own business.

If your end of the selling price is too big, then cut the price. When you cut prices you cut profits, not costs.

When you get hold of a smith or shoer who thinks more of his work than of you or your customers, hang onto him.

Good brains, good materials and good tools will come very near to getting good prices—if you insist upon good prices.

Turn out your work a little earlier, a little better than is called for. It may mean a little stronger effort, but it's worth it.

Worry your competitor by paying so much attention to your own business that he'll think you've forgotten all about him.

Give your neighbor a good start on the road to a broader, better, more prosperous new year by getting his subscription to "Our Journal."

Much of the drudgery is taken out of smith work by modern machines. It's not necessary to work like a slave—proper tools are what you want.

Keep in touch with your trade by reading a good, practical craft journal. A smith without a good craft paper is like a smith shop without tools.

The season of resolutions is at hand. Better to turn a new leaf and turn it back than not to turn it at all. But, better still, is to keep the leaf turned.

The biggest part of the load is not always carried by the spoke that squeaks the loudest—nor is the best smith always the one with the loudest voice.

You must get a bee for honey. As well expect honey from the ant as to expect good work to result from poor material, poor tools and a poor shop.

Inattention to collections has caused the failure of many a business. A man cannot do business on the money outstanding. Keep at the heels of your debtors.

A penny postal bearing your name and address and sent to the secretary will bring you plans that will solve your smithing problems. Address the card today.

You can figure it out for yourself. It takes a lot of time to repair an old tool every time you want to use it. It means money in your pocket to get a new one.

When the cost of supplies goes up and the price you get for work stands still, your profits are cut down and it's time to get a better price. See that you get it.

"Why can't the dog eat from that tin dish?" asked Mrs. Newlywed. "I can't see the need of ordering hound plates." But her husband just winked at the jobber's salesman.

China, it is said, has enormous possibilities as an iron-producing country, large deposits of high-grade ore having been discovered. Coal is also available in extensive quantities.

John Hogan says; "Yer horse was worth nothin' with the lame foot—now he's worth more than you paid for him. Why do you kick at my price for shoein' him right?"

Like Tom Tardy, some smiths say, "I can't get all the business." Of course you can't get it all, but are you getting all you can? You can't tell until you try. And then try, try again.

'Twill not be wasted these days—that little extra attention to the gas engine. Cold weather always brings its gas engine troubles with it. Smooth running is insured through careful attention.

Exercise of brain is as necessary to healthy growth as exercise of body. What does it profit a man if what he knows, though it be much, has been in his head so long that it has grown to him?

"You can't teach an old dog any new tricks," answered Tom Tardy, when we asked him why he didn't read "Our Journal." Evidently Tom still thinks he knows all there is to know about smithing.

Growing constantly is the demand for young blood. Induce the young man to take up the good old trade. Teach the youngsters all you know, for the apprentice of today is the craftsman of tomorrow.

Your wife trades with butcher Smith because Mrs. Brown trades there and gets good service. Ever think that your customers apply the same line of reasoning? Give good service and get good customers.

The best smith in the county you may be, but who will know it if you don't advertise the fact? Let the country around about know what you can do and how well you can do it. Persistency along this line

"It gives me lots of good pointers," says an Iowa smith referring to the auto department. Are you getting your share of the automobile trade in your section? Better read our "horseless department" and increase your profits.

Gray-haired methods won't do for brown-haired people. Because your "grand-pop" did is no reason for your doing it the same way. The modern year demands modern methods. It's a case of keeping up with the leaders or dropping out altogether.

A suggestion—send us a one-dollar bill and get a year's subscription to "Our Journal" for a friend; six months' subscription for yourself; a new subscriber for us. Can you distribute more good cheer for so little money in any other way?

Nothing to say? Is that your position? Surely you don't agree with all that is said in these columns! Let us have your opinions, suggestions or criticisms—others will be as interested in your talk as you are in what others say. Sit right down now and write

Shop mottoes, business slogans and other means calculated to fire ambition and solve



the problem of success cannot help a man to a better hold on life's necessities. Knowledge—good, solid, practical knowledge—on the man's chosen trade will make him a better man, a better worker, a bigger success.

Most local smiths were hard at it from early morning until late at night last Friday. 'Seemed as though every horse-owner had been caught napping by Thursday night's hard freeze. And most of the boys showed a neat increase in their bank accounts as a result. Not so Tom Tardy—he turned several teams away at five o'clock so he could close up on time.

Association Notes. The Second Annual Meeting of the Nebraska Association.

The second annual meeting of the Nebraska Blacksmith and Horseshoers' Association was held at Hastings, November 10th and 11th.

The opening address, by President J. W. McKay, detailed the history of the Association and its work and was followed by an address of welcome by the mayor of Hastings.

Attorney E. C. Strode, of Lincoln, was reinstated as attorney for the Association. The report on the books of the secretary and treasurer was made by the executive committee. The Association then took an automobile ride as guests of the business men of the city.

During the evening session there was a discussion on legislation. Several bills were also read and referred to the executive committee for alteration. The address of Mr. J. H. McCord on "Power in the Shop' and Mr. W. M. Rosborough's address on "The Object of the Association' then followed.

Wednesday morning's session was taken up by the reading and adoption of the bills for legislation. Then followed a recess for the affiliation of new members. Short addresses by Messrs. M. P. Hinchey and J. W. Edwards closed the session.

The officers elected for the ensuing year are: President, J. W. Edwards; vice-president, J. H. Hogan; secretary, George E. Loder; treasurer, Robert McIntyre. The executive committee: J. I. Depew, W. G. C. Wooster and J. W. McKay.

A vote of thanks was tendered the citizens of Hastings for courtesies shown the Association. Mr. M. J. Hinchey then introduced a resolution condemning the practice of some jobbers in retailing to the customers of smiths and horseshoers. Addresses by representatives of several manufacturing and jobbing houses closed the convention.

Proposed Blacksmiths, Lien Law in Iowa.

The Iowa State Blacksmiths' Association is taking the initiative in this movement. It is proposed to pass a law that will enable blacksmiths to secure prior liens on horses for shoeing them and on vehicles, machinery and tools for repairing. The present lien laws apply only to real estate.

Lumbermen, carpenters, masons, plumbers, painters and contractors can enforce payment for every dollar coming to them, and it is right they should. "The laborer is worthy of his hire." The present laws are just. They injure no one. But, is

there any reason why the blacksmiths and wagon makers should not be protected in the same manner? Our lien laws at present are a sort of class legislation. The reason for this is that the blacksmiths have been sleeping on their rights. They have never made any effort to get the law passed, and it is safe to predict that the new proposed law never will be on the statute books of Iowa, unless the blacksmiths unite and co-operate in this great work. The representatives and senators should have the matter explained to them. They should be shown the reasonableness and justice of such a measure. Then when they get to Des Moines they will be fully posted and will no doubt be in favor of the measure. And, lest they forget, a man representing the blacksmiths' interests should be at Des Moines while this matter is before the Legislature.

This law would be worth a million dollars to the blacksmiths of this State. It would enable them to get their pay for every job they did. If everyone would contribute the sum of ten cents this would defray all the necessary expenses. Our society is yet in its infancy. We are willing to do our share and more, but it is too much to ask one small organization to do all the work and the rest do nothing but reap the benefits. We shall be pleased to submit our proposed law to anyone who is interested, and we ask all blacksmiths and especially blacksmiths' organizations in Iowa, to write as soon as possible, stating what they will do to help us.

J. A. Hamilton, Secy. Iowa Blacksmiths' Association, Algona, Iowa.

American Association of Blacksmiths and Horseshoers.

Some craftsmen will perhaps learn of The American Association of Blacksmiths and Horseshoers and its work for the first time when they receive this copy of THE AMERICAN BLACKSMITH, and to these craftsmen a word of explanation is due.

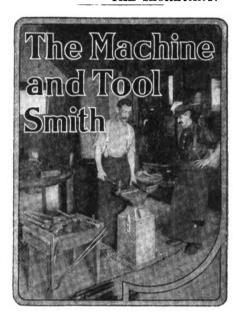
The object of this movement is to band the smithing and vehicle craftsmen together for protection, for strength, for harmony. Other trades and professions have the protection of cooperation and organization, why not the smithing craft? There is no reason why the smith, the horseshoers, the vehicle workers cannot get the same protection if rightly organized.

Already numbers of branch associations have been organized. Counties have co-operated and formed state associations and the state organizations are getting the needed laws for the protection of their members. There is practically no limit to the benefits to be gained through organization and co-operation. Better prices can be agreed upon, dead-beat and slow-pay customers guarded against, united action gotten on needed legislation, and other benefits too numerous to mention. The force

of combined effort is wonderful, and when the object sought is of such great benefit to the craft, not one single member of the trade should hesitate to lend his aid and support.

If you cannot claim the benefits of an organization in your county address me, P. O. Box 974, Buffalo, N. Y., and by return mail will come my easy plans for organizing branch associations. A postal will do—but write right now, before you forget all about this. A movement started in your county now will net you full benefit during the spring rush.

THE SECRETARY.



In annealing steel care must be exercised in heating. The heat may be carried to an extreme when it will open the grain of the steel so much as to reduce its strength.

D. M. T., Massachusetts.

In working steel remember that the tempering heat is not so high as the annealing heat; that the annealing heat is not so high as the hardening heat, and that the hardening heat is not so high as the forging heat. In the case of high-speed steel, however, these rules do not apply. S. F. A., Maryland.

A good idea for the smith who has an occasional job of tool hardening and tempering to do is to build a simple forge in which to burn charcoal. Then, no matter what the condition of the regular fire, a charcoal fire can be started with little trouble and good results gotten. No blast is necessary when heating with charcoal.

A. Z., Ohio.

To anneal self-hardening steel is somewhat more of a job than the annealing of ordinary tool steel. It must be heated considerably hotter than plain carbon steel and the great point in its successful treatment is the very slow cooling of the pieces. It cannot be cooled too slowly. The annealing should be done in closed pipes, packed with charcoal, not air tight (it might blow up), and the cooling should take about twenty-four hours. J. A. M., Illinois.

Thermit Welding. G. W. KELLY.

We have followed the Thermit process in making repairs on locomotives since February, 1905. Our experience thus far is that repairs are permanent. We have in service at the present time 224 Thermit welds. I am aware that applying these new cast-steel sections:
As they are already machined ready

As they are already machined ready to apply, the broken frame is cut off and a new section bolted in, allowing

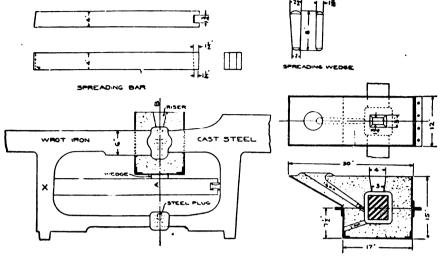


FIG. 1-BROKEN ENGINE FRAMES ARE QUICKLY REPAIRED WITH THERMIT

the majority of foreman blacksmiths have a knowledge of the principles of Thermit, but, in behalf of those who are not familiar with it, let me quote a few lines from a lecture given by the inventor.

"Just as generations passed over mineral coal without detecting its combustible properties, it was not known heretofore that aluminum belonged to the combustible products, which under certain circumstances, once ignited, continues its own combustion. Aluminum mixed with iron in combination with oxygen, forms the compound called 'Thermit,' which name is copyrighted. When this is ignited the chemical reaction is the simplest, resulting in aluminum oxide and pure mild steel at 5400° F. in thirty seconds. Thermit must be ignited by a so-called ignition powder. Thermit thrown into an open hearth fire will not burn because the temperature of the fire is insufficient to ignite Thermit. By no other known means has it been possible to produce liquid steel in so speedy and simple a manner. This superheated steel when it comes in contact with bodies of wrought iron or steel at a red heat must result in a perfect amalgamation."

In regard to locomotive frames we now have an engine in shop for light repairs on which the forward steel section was applied March 7th, 1907. This is one of the twenty applied since August 17th, 1906. We now have eight continuous frame sections in service making fifty-six welds—no failures The following is our method of

4 to 1 inch for a free flow of Thermit. The frame is now trammed and jacked apart $\frac{3}{2}$ to $\frac{1}{2}$ inch to allow for contraction. A short steel wedge is driven in the opening between the old frame and new section in both top and bottom rail, and jack removed. A wax collar 3 to 1 inch in thickness is applied to top rail overlapping 1½ or 2 inches on each side of opening. The bottom rail mould is made in two parts over wooden patterns and dried. The bottom half of the mould box for top rail is adjusted and the spreading bar is placed under it, allowing one inch space between the two for a wedge to hold mould in position while preparing it. See the accompanying engraving.

The mould on the top rail is then completed. The spreading bar holds the frame apart until the frame is preheated and the top weld made. When the Thermit becomes set the spread-

ing bar and mould is removed, and the mould applied to the lower rail and the weld made. To relieve any strain due to uneven contraction we heat front leg of second pedestal, see X Fig. 1. To arrive at close results the frame must be jacked apart from $_{16}^{3}$ to $\frac{1}{6}$ inch in proportion to the size of the frame. We make it a point to have our frames trammed $_{32}^{1}$ inch longer, rather than short. The writer is still of the opinion that failures are the result of undue strain or neglect in making proper allowance for contraction.

See engraving showing our standard mould. This will take a frame 4 x 4 to 5 x 6 inches. The pouring gate will take a flow of Thermit from a 75pound crucible. Should a larger crucible be used, with a tapping hole larger than one half inch the pouring gate should be made larger. The one inch round hole in bottom of mould is to let the wax run from the mould when the heater is placed in pouring gate. Before the frame becomes properly heated this hole is filled with a dry core after the wax has burned out. We get a perfect combustion around the frame by letting the gas in the pouring gate. When the mould becomes dry it is used as a furnace, and the frame can be brought to white or fusing heat in sixty to seventy minutes.

In repairing cast-steel driving wheel centers, the use of wax for patterns has made the work much easier. Four or five spokes can be welded at one time. Engraving, Fig. 2, shows wheel with four Thermit welds on four consecutive spokes. We used for this job two crucibles, and had two pouring gates, each feeding two spokes. One advantage in making welds at the same time is the uniform contraction. If one or more spokes are solid in the same wheel section they are heated to

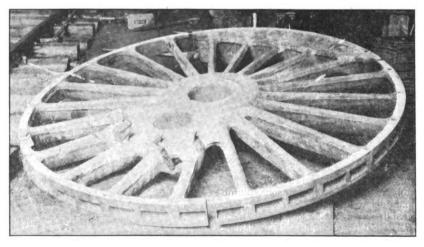


FIG. 2-FOUR OR FIVE SPOKES CAN BE WELDED AT ONE TIME

a red heat in a slow charcoal fire, while broken spokes are being pre-heated for welding. After welding, all spokes are allowed to come back together.

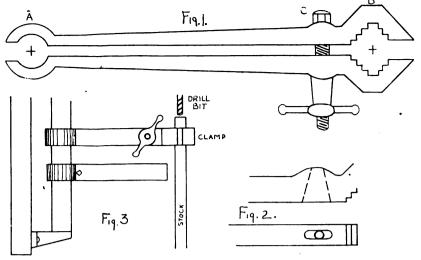
A Clamp for Holding Round Stock Under the Drill Press.

G. R. SWARTZ.

The accompanying engravings show how to make or fashion a clamp or vise for holding round stock under the drill press or post-drill. The engraving Fig. 1 shows the clamp itself, the part at A is made to fit around the column which carries the drill table. Each piece should reach about one third of the way around the drill. This will allow A to grip the column firmly when a large piece of shafting is held in the jaws at B. The distance between the centers at A and B should be exactly the same as the distance from the center of the column which holds the drill table to the center of the drill bit. The jaws at B may be toothed like a pipe vise as shown, or they may be left smooth and an oldfashioned lathe dog used to keep the stock from turning. If the jaws are toothed they will, of course, need to be tempered or at least the teeth will need to be.

If the jaws are left smooth and a lathe dog used, the shafting or stock to be drilled is fastened plumb under the drill bit, the lathe dog is slipped over the shaft or stock and the tail of the dog placed over the jaw of the clamp and against one of the arms. The set screw is then turned tightly and the drill started.

The bolt C of the clamp should be of mild steel and at least three fourths



FOR HOLDING ROUND STOCK UNDER THE DRILL PRESS

or seven eighths of an inch in size. Figure 2 shows the manner of forming the bolt holes and also the boss upon

the bolt holes and also the boss upon which the head of the hand nut rests. This arrangement gives a good bearing

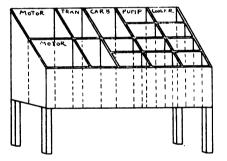


FIG. 1-A HANDY BOX FOR THE REPAIRMAN

for the bolt head and also permits the jaws to have considerable play without binding on the bolt or injuring the thread on the bolt. In Fig. 3 is shown how the clamp is applied or attached to the drill.



An easy way to clean the under shield of oil and grease is to open the drain cock immediately after a run, and while the oil is warm.

F. W., Illinois.

An excellent packing for a leaky pump is asbestos string well rubbed with black lead or graphite. Rub the lead into the string thoroughly. R. A. C., New York.

When assembling any part of an automobile that is secured by more than one bolt, do not tighten more than one nut at a time, but give each a few turns in regular order until all are tight. B. O. R., Pennsylvania.

To bend copper tubing, heat the tube at the point to be bent in the flame of a brazing torch till red hot and then cool in water. This will anneal the tubing. Then bend, a little at a time, over a round bar held in the vise. Any tubing larger than three eighths inch had best be filled with dry sand before attempting to bend.

O. A. F., Ohio.

Dissembling an Automobile.

First build a department box or bench, as shown in Fig. 1. This can be made of pine and the bins lined with sheet iron so as to stand the wear. The bins should be made in different sizes and should be labeled, as shown. This box could be placed on four strong legs with casters so as to be easily moved about. When taking a rig or auto apart have the box close at hand. When you come to the dirty, greasy parts (which will show up as soon as you remove the tonneau), wash the parts with gasoline and place them where they belong in the box. Before going further let us explain a very important point; that is, be sure and mark each large and small part before taking it from its place. See Fig. 2, A is a small cap screw in the casting B. Do not loosen the cap screw until you mark with a fine pointed prick punch, as shown at C. You will then know where things belong and how tight they were when taken apart. This rule should be closely observed with nearly all parts, for when repairing an auto in a hurry it is important that you do not break any more parts than you can help, as they are not to be found in every hardware store.

Take as one instance the connecting rod bolts, if you do not mark these before removing you will be delayed when replacing, and we all know those bolts must be just right in order to give satisfaction. It is hard to get them just right if you lose a liner or two and tighten the bolts too much.

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A very useful tool in this line of work is one for pulling keys, in fact it is almost indispensable when taking an auto to pieces. It is shown in Fig. 3 and can be made from 3-inch round or octagon tool steel and should be about eighteen inches long with the ends shaped, as shown. The long, slender punch, shown in Fig. 4, should be about 101 inches long and should be drawn down to a long taper not more than 1 inch at point. You will use this a great deal driving out taper pins. Then there is the slender cold chisel, Fig. 5. This should be about ten inches

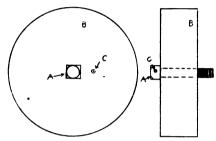


FIG. 2-ALL PARTS SHOULD BE MARKED

long and drawn out very thin in order to get down between parts.

An auto is brought in for repairs; the trouble with the machine is in the crank shaft and rear sprocket. After removing the body, the toe board, steering post, hood and everything in the way of getting at the motor the auto will appear as in Fig. 6. The motor is now removed and placed on a form made

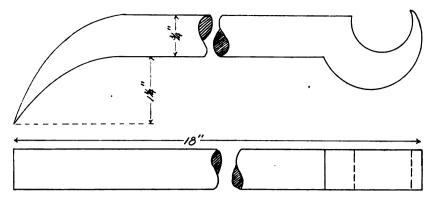
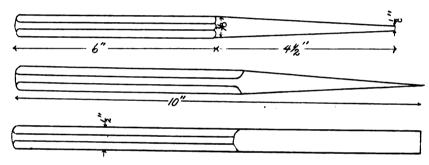


FIG. 3-A HANDY TOOL FOR PULLING KEYS

Now an automobile repairman is somewhat like a dentist, he doesn't know just how much trouble is in store for him until he digs in and takes things to pieces. In this case it was found that the connecting rod was bent. It was easily straightened by the smith after heating to a very low red and bent back to place. Fig. 9 shows the end

serious problem and a "bug-a-boo" to the amateur—the removal and replacement of a clincher tire.

These directions presuppose that proper tire tools, such as jack, tire irons, pliers, etc., are on hand. In the case of a puncture only, it is, as a rule, unnecessary to take off the shoe from the rim. Simply proceed as directed in



FIGS. 4 AND 5-A SLENDER PUNCH AND ALSO A COLD CHISEL ARE NEEDED

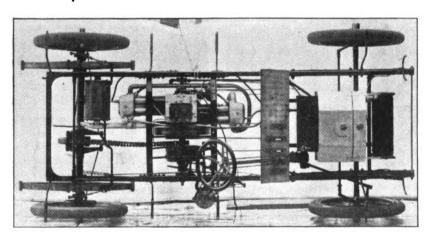


FIG. 6-ALL PARTS ARE NOW ACCESSIBLE. CHASSIS OF A REO CAR

for this purpose, which allows a man to get all around and underneath without any trouble. This form with motor in it is shown in Fig. 7. The motor is then taken to pieces and the crank shaft is replaced with a new one, and just before putting together again we show fly wheel crank shaft and motor frame in Fig. 8. The rear axle had to go through the machine shop and also the brazing departments.

of connecting rod, two cylinders and a piston. The coolers, or radiators, were also out of order. After soldering up a few leaks the cooler was replaced as good as new.

How to Take Off and Put On a Clincher Tire.

It is safe to say that by the proper perusal of these directions anybody can accomplish what has always been a paragraphs one, two, three, four and five below. The puncture can then be patched and the tube replaced without taking off the shoe.

No. 1. The first thing necessary, of course, is to jack the car up so the wheel is clear of the ground and will revolve freely.

No. 2. Next, to be sure that all the air in the tube is allowed to escape. It is dangerous to take off a tire with any air in the tube. The quickest means of allowing air to escape is to take the cap off the valve and with it unscrew

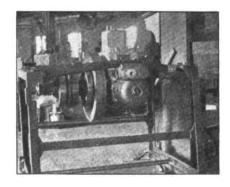


FIG. 7—A SPECIAL FRAME FOR HOLDING MOTOR

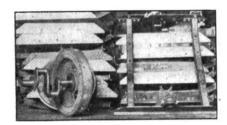


FIG. 8—FLY WHEEL, CRANK SHAFT AND MOTOR FRAME

and take out the valve insides completely, which will let the air out quickly.

No. 3. Now, with a pair of pliers, loosen all the nuts that hold the lugs in place and turn them down to near the point of coming off, as shown in the illustration in Fig. 1 below.

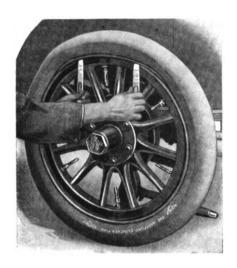


FIG. 1—ALLOW ALL AIR TO ESCAPE FROM TIRE TUBE

No. 4. Now take the two tire irons, and shoving them under the clinch, lift it over the edge of the rim, as shown in Fig. 1. Revolve the wheel around and change the position of the tools, keeping them always about six inches apart,

until the clinch on the outside is entirely free from the rim.

No. 5. When the outer clinch is entirely free, now reach under with the hand, and, pushing the valve up, take out the tube.

No. 6. Next slip tire off over the lugs. Then clean the rim completely, as shown in Fig. 2. Never attempt to put on a clincher tire with the lugs on the rim.

No. 7. Now that you have the rim cleaned completely, put on the tube in the casing and set the same over the valve hole, as shown in Fig. 3.

No. 8. Next take the two tire irons, as shown in Fig. 4, and force on over the outer rim the inner clinch, as illustrated.

No. 9. Put on only the inner clinch so the outside clinch is entirely free from the rim, as shown in Fig. 5.

No. 10. Now put the lugs in from the back, as shown in Fig. 6. Never attempt to put the lugs in from the front. Having put the first lug in, as shown in illustration, Fig. 6, take the two tire irons and lift the inner clinch over the first lug you have put in; then turn to the next lug and repeat the operation.

No. 11. When all the lugs are in you are now ready to force in the outside clinch. In doing this, be sure of first having the nuts on the lug bolts away down to the end so as to give them plenty of free play, pushing up the lug bolt, as shown in illustration, Fig. 7. This you do to push the tube up clear of the rim so that the clinch will not pinch it.

No. 12. This is very important for if the tube becomes pinched under the rim it will blow out as soon as you pump up the tire.

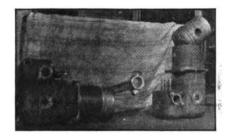


FIG. 9—THE CYLINDERS, A PISTON AND CONNECTING-ROD END

No. 13. Before you pump up the tire push up every lug in the wheel as far as possible to see that the tube is entirely free from the clinch all around.

No. 14. Now you have the tire completely on, as shown in illustration, Fig. 8. It remains only necessary to tighten



FIG. 3—BEGIN AT VALVE HOLE TO REPLACE TIRE

up the lug nuts securely; to screw on the nut that holds the valve in place, and to pump up the tire.

We are indebted to the Hartford Rubber Works for the foregoing description and the illustrations, and

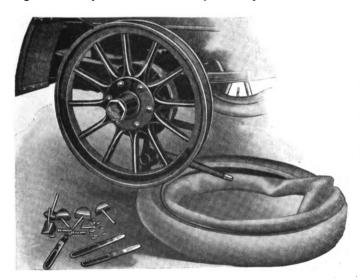


FIG. 2-START TO REPLACE TIRE WITH A CLEAN RIM

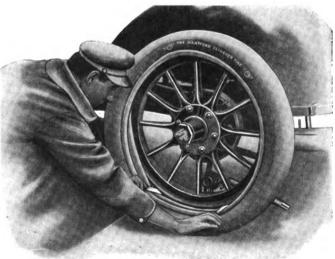


FIG. 4—FORCE INNER CLINCH OVER OUTER RIM
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trust that they will prove of value and assistance to those of our readers who are interested in automobile work.

Adjusting, Repairing and Caring for an Automobile.—3.

The Transmission.

To remove the transmission without removing the radiator or motor; remove the drip pan; block up the rear end of the motor with a small horse or box.

Disconnect upper rear spring clips so axle can be slipped back (the axle can be sprung back sufficiently, but this is not good practice), remove bolts connecting transmission frame to motor. Disconnect front radius rods by removing cap which connects ball joint to transmission frame. Remove bolts holding transmission frame in chassis. Slip transmission frame back until shaft disconnects with engine crank shaft. Transmission and frame may then be lifted out. To remove transmission from frame remove three brake bands and lift out.

To dissemble transmission; first remove the rear plate by taking out six screws. Then, holding front end of transmission shaft in a vise (or better still, slipping the squared hole over a 7 or 15-inch square steel bar fixed in a vise), take a large wrench and turn locknut, which is just inside of rear plates, to the left until the pin is sheared off; remove nut. The part of the pin left in the nut may then be driven out. (It is unnecessary to drill out the other half of the pin which has been left in the plate because the nut, when replaced, will not screw up to the same point: so it will be necessary to then drill another hole in the plate to register with that in the nut when tightened.)

Remove thrust plate, first taking out Woodruff key which has been exposed; remove two small friction plate keys; take out friction plate. Other parts will then dissemble in rotation.

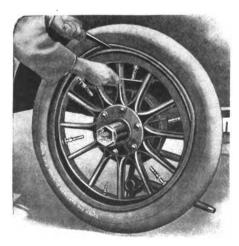


FIG. 7-PUSH UP LUG BOLTS



FIG. 5-OUTER CLINCH SHOULD BE FREE

The slow speed gear is attached to the brake drum—the middle one of the three. To remove gear; drive out eight rivets with %-inch punch. Reverse gear is attached to reverse plate

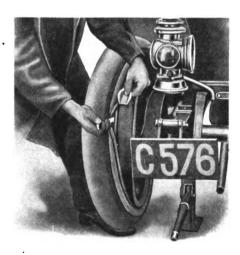


FIG. 6-PUT LUGS IN FROM THE BACK

and may be removed by driving out rivets as above.

The gear which is keyed to the main shaft will generally slip off easily, but if not may be driven off by using a block of wood to prevent marring.

To remove triple gears; first drive out pins which secure the gear shafts in the drum, using a \(\frac{1}{8}\)-inch punch. Pins can be driven from the outside; drive out shafts and gears can be easily removed. Note carefully the position of gears, as otherwise it will be somewhat of a puzzle to re-assemble them. The fiber thrust plates will wear almost indefinitely if kept lubricated, but may be replaced at any time at a small cost should they be allowed to run dry and cut.

Should the high speed clutch fingers become worn so that it is no longer possible to adjust the high speed clutch

to hold properly they should be replaced.

To remove fingers from spider—drive out rivets. In replacing fingers be careful to rivet them so they will remain free, as otherwise they are liable to bind and hold the clutch in contact when it is supposed to be released. If oil is put on the cone and fingers occasionally they should wear a long time. It should not be necessary to replace the main shaft or spider during the life of the gear unless carelessness has been exercised when adjusting the high speed clutch not to tighten the set-screw sufficiently to hold. If the set-screw slips it is liable to tear the threads off the shaft, in which case a new shaft will have to be put in.

If excessive looseness develops in the transmission it is well to take it apart and inspect the gears and bearings thoroughly to ascertain the cause. Should the bearings have been allowed to run dry the bushings may be badly worn or the shaft cut, and the sooner this trouble is discovered the easier it will be to avoid a more serious repair account. Bronze bushings may be easily replaced, using a bushing driver. Remove the old bushing and press or drive a new one in place. The transmission case should be filled with Albany grease or other heavy oil about once every two weeks. Excessive slipping of the high speed clutch, due to imperfect adjustment, will tend to heat the transmission and draw the oil out of it. When not revolving the oil in the upper side of the drum if hot and thin will leak out slowly. If the precaution is taken to throw in the high speed clutch when leaving the car for any length of time, a great saving of oil can be effected as there is then no chance for it to work out. Great care should be taken, however, to always release the clutch before cranking the motor to start.



FIG. 8—THE TIRE ON AND READY



To adjust low, reverse and brake bands; use a socket wrench, loosen locknut couple of turns; then turn adjustment nut to point desired—to the right tightens band, to left loosens. Transmission brake and low are adjusted from above. Reverse is adjusted from below (holes in drip pan provide accessibility). The fiber gives ideal friction surface and holds best when oiled. If permitted to run dry it will burn or cut. Can be replaced easily by ordering the fiber segments and riveting to place. Care should be taken to see that bands are a true circle, so that they do not drag when disengaged and that they take hold all around the drum when applied; high points cause noise when starting. To avoid unnecessary noise gradually apply the "low" with motor throttled down slow; let car get under way easily, then press on the "high" gently till the motor gets hold of its load, when the high may be pushed home. Then with throttle gradually increase speed of car to any degree desired, advancing spark if you desire to go at more than eight or ten miles an hour. Starting as above will add wonderfully to the life of the car, reduce or eliminate repair bills and increase the pleasure of motoring.

(To be continued.)



To point an old lay which has worn too short use an old rasp which has been heated and the teeth hammered down smooth and flat.

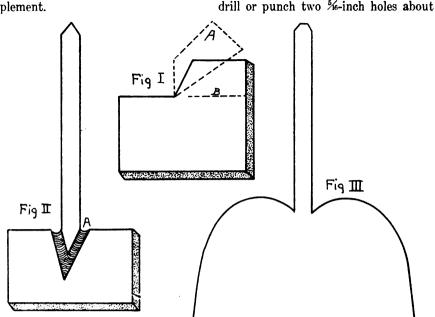
D. M. K., Kansas.

For sharpening plowshares a round-faced three-pound hammer will be found the most convenient. Draw out the share by hammering on the upper side, while the lower side is kept straight and held flat on the anvil. For quick work in drawing out a very dull or thick share, the share may be turned bottom up and the edge drawn out by using the cross pene of the hand hammer.

F. B., Illinois.

How to Forge a Garden Hoe. c. w. metcalf.

The world is full of good smiths, but how many of them know how to make so simple a thing as a hoe? I will give a few explanations for making this implement.

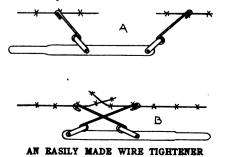


HOW TO FORGE A GARDEN HOE

The hoe blade is cut from a bar of steel, as shown in Fig. 1. Take a bar 3½ by ½ inch and cut it three inches on the long side and two inches on the short side. Then cut on dotted line at B, leaving ? of an inch in the center. Now bend small piece up, as shown at A. This part is for the shank and when drawn out to 1 inch it will be 71 inches long, the required length for the hoe shank. When this is done, as shown in Fig. 2, fuller in, as shown at A. Fig. 2. Then fuller out till the blade is eight inches in width and five inches in depth. Now trim up, as shown in Fig. 3. Heat it evenly and temper in oil, burning the oil off and letting the blade come to a blue. Then grind and polish. Now heat shank and bend, put on your handle and go to work.

An Easily-Made Wire Tightener.

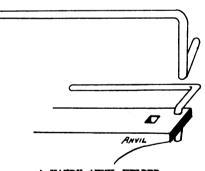
To make a contrivance for tightening barb wire in the fence or drawing it together for splicing when broken, take a piece of stock a quarter or five sixteenths by one inch and about three



seven or eight inches apart. Then make two small clevises, like small plow clevises in shape, and bolt one to each hole in the bar so they will work freely. Then make two grabs for the barb wire of \(\frac{2}{3}\)-inch round iron (horse rake teeth make good ones) about eight inches long when finished, with a large eye in the end connecting them to the clevises. To tighten wire, place grabs on wire, as shown at A, take hold of handle and

feet six inches long. Round up one end

for a hand hold and at the other end



A HANDY ANVIL HELPER

pull it around to the right until parallel with the fence, when the wire will be drawn, as shown at B.

A Handy Anvil Helper. w. w. DAWKINS.

Here is a simple little device that has helped me very much. I pass it along with the hope that it will also help my brother craftsmen. Take a piece of round stock the size of the round hole in your anvil. This piece should be about thirty inches long. Now, bend the piece, as shown in the engraving,



allowing eighteen inches for the longest arm of the device, eight inches between the two bends, and three inches for the short part to be inserted in the anvil hole. This makes one of the best helpers I have for holding iron, or any work, on the anvil while welding.

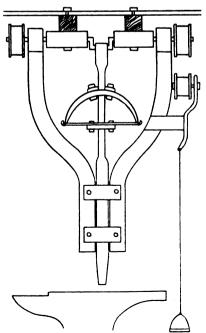
A Light Forging Hammer.

D. FOSTER HALL.

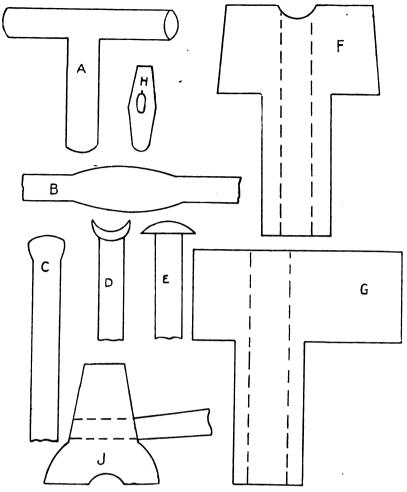
The accompanying engraving shows a light forging hammer. It is simple, durable and easily made. It takes up no extra room in the shop as it may be hung over any anvil and can be swung up out of the way when not in use. It will strike a very heavy blow, for the reason that there is a certain spring in the timbers overhead to which it is attached which we do not get in a rigid frame hammer. Then, too, there is no expense for anvil block. This entire outfit can be made by almost any black-smith at a very small outlay.

The hammer consists of two hangers or bearings of wood babbetted for a 1½-inch crank shaft. These hangers should be eight inches long, four inches wide and four inches thick, with two ½-inch bolts in each piece to hold them to the timbers overhead. The crank shaft is made of 1½-inch cold rolled steel. If this crank is made with a core no lathe work will be required on it. On one end of this shaft is a 12-inch fly wheel and on the other end a 10-inch driving pulley. Both of these should be fitted with a key, as there is considerable strain on this shaft.

The two side pieces are of three-inch channel iron with the flat on the inside



A HANDY FORGING HAMMER



TOOLS USED IN FORGING T-IRONS

to form, at the lower part, the guides for the ram head. Two pieces on each side, two by one half inch, hold the frame in place and form guides for the ram. Bearings on the upper ends of the channel irons can be made of wood or iron and babbetted. The channel pieces can be made of any length to suit the height of the room in which the hammer is located. Two 3-inch rods with turn buckles are used to hold the frame in position over the anvil. Make the connecting rod in two pieces with \{\frac{1}{2}}-inch bolts each side of crank. The ram head is of iron two by three inches with a steel face drawn small at upper end and bolted to spring, which can be made of an old carriage spring with strap to connect at lower end. This hammer is run with a loose belt and tightener which can be worked by foot or hand. There are no obstructions in working this hammer from any side and the stroke should be four inches with a speed of about two hundred and fifty revolutions per minute.

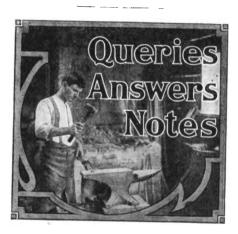
Forging T-Irons. BILL KELLEY.

The accompanying engravings show how an order for several hundred T-irons

was turned out for a Rochester, New York, firm. Not a weld could be seen in any of the finished irons.

In the engraving A shows one of the finished forgings. At B is shown a piece of round stock upset in the center from three sixteenths to one fourth inch or more. This upset is about three inches long. At C is shown a piece of round stock upset on the extreme end only. After upsetting, the piece is shaped, as shown at D and E, which are the end and side views of the same piece of iron. This shaping is done in the swage shown at F and G, which represent an end and also a side view of the anvil tool. The fuller shown at H is used with the swage in shaping the end of the piece. After shaping with the fuller it is removed from the anvil tool and thinned, on the edges only, over the horn of the anvil with a fuller or the pene end of the forging hammer. The dotted lines at F and G represent a round hole drilled through the swage in which C is dropped to shape it, as at D and E. One side of the anvil swage, as shown at G, is longer than the other, so that it will set to the edge of the anvil. The smith. in making one of these, should make it so it will fit his own anvil.

The next operation is welding. The smith, with a pair of tongs, takes hold of the stem to be welded on (if the other piece is long enough hold it with your hand, if not, use a pair of tongs) and takes a welding heat with a clean fire. Two heats should be taken on the piece, the first one being a moderate one. In taking the welding-heat on the stem, the smith should hold it straight up and down so as to take his first heat on the extreme end only. The second heat should be a good heat, and in taking the piece from the fire, put it into the round hole in the swage and with the aid of your helper use the top swage at J. Drive the pieces into shape and welding them at the same time. Then proceed to swage down to size with your swaging tools. Use a good welding compound: I use Cherry Heat. You'll need to work lively in your heats because they won't wait for you.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Has an Interferer.—What is the best plan to shoe a horse that interferes? Is it all right to put a side weight on the shoe, or is there a better way? I had a horse that interfered when he had no shoes on and he was very bad. Daniel Johnson, Kansas.

Wants a Special Shoe.—Will some brother smith kindly describe for me through "Our Paper" the best shoe for a mule that walks on his toes. The trouble is caused by hard pulling.

Elmer Perkins, Indiana.

Wants to Make a Stone Chisel.—I would like some kind brother smith to tell me how to make a machine to cut teeth in a stone chisel, or where I can get one. I want something to cut three or four teeth in a chisel.

Daniel Johnson, Kansas.

He Must Have It.—Although I am not as actively at work at the trade as I was when I signed for "Our Journal" yet I must have it. I still consider myself one of the craft and hope to see the boys all get good prices. J. T. HARVEY, Missouri.



SHOP OF FRANK H. HORTON, MINNESOTA-AT TRADE ELEVEN YEARS

What Say You, Folks?—I would like to know the opinion of brother readers in regard to "Our Paper" being published twice a month. I would willingly give more than twice the present cost for two papers a month.

P. J. Collum, Iowa.

A Question on Tire Setters.—We desire to ask our brother smiths about tire setters. Has anyone used a Mayer's machine? Will it do the work claimed for it? We would be glad to hear from someone through "Our Paper." M. & R., New Mexico.

That Nail Problem.—In answer to Mr. P. V. Burgess' foolishness will say that he would get \$42,911,872.95 for driving four shoes. For the first nail he got one cent, for the second one two cents, for the third one four cents, for the thirty-second nail \$21,474,836.48.

J. R. S., Oklahoma.

About Purchasing Supplies.—I would say to W. H. Lehman and to F. H. Chadwick that I buy my stock from the jobbing houses in Kansas City for about 75 per cent of what our hardware merchants want at this place. On bolts I pay fifty per cent and sometimes less than this, and for a better article.

J. R. S., Oklahoma.

A Wisconsin Smith's Home and Shop.— The accompanying engraving shows my home, with a partial view of the shop next door. Fourteen years ago I started a shop for myself, renting a shop the first eight years. I now own my own shop and do a good business with my boys to help me. I stand in front of the window and my boy in the door of the shop. The shop and house are my own handiwork, done as a sideline. The picture shows rear of shop, which is on the corner lot.

This town has about two thousand population, waterworks, electric lights and sewerage. My best work is horseshoeing and plow work, and I also do other repair work when I have time. I get 35 cents per pair for fitting and setting, 35 cents peach for new shoes, 50 cents for Neverslips, and 5 cents for new calks.

I believe that all work and no play makes a dull boy. July is a dull month with me, so I take a vacation every few years. In the last seven years I have made four trips East, visiting in New York, Albany, Niagara Falls, Coney Island and lots of other interesting places. H. C. Young, Wisconsin.

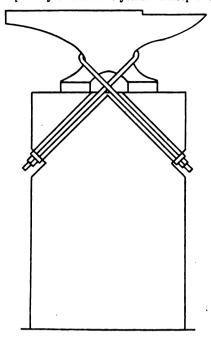
Some Alabama Prices.—I will write you a few lines to tell you how I like your paper. I owe the greater part of my success to THE AMERICAN BLACKSMITH and it has put new life in me since I have been reading it. I have an up-to-date repair shop and would like to see the smiths get together on prices. I will give some of my prices:

Four new shoes	\$1.00
Resetting four shoes	.80
Rimming buggy wheels	4.00
Wagon tongue	1.75
Boister, front and hind	1.00
New buggy shaft	1.75



THE SHOP AND HOME OF H. C. YOUNG, WISCONSIN

Other prices are about the same. I am a young smith, twenty-eight years of age, but have worked at the trade for nine years straight and have been running a shop of my own for five years. I keep two



A SOLID ANVIL

men busy besides myself and don't have an idle minute. I hope to see the day come when every smith will have to have a license before he can shoe a horse.

W. W. Abney, Alabama.

To Make the Anvil Solid .- To have the satisfaction of a solid anvil to work on I did this way: 1 got a piece of timber eleven inches square and set it in cement and stones, leaving eighteen inches above the floor. To fasten the anvil to the block I cut V-shaped notches in the side of the block, as shown in engraving, the sides of the V being one and a quarter inches wide. I then cut two pieces of iron five sixteenths by one inch as long as the width of the block (eleven inches), and punched a hole in each one of them to take a f-inch rod. I then gouged out channels from the top of the block to the V notches, got the length of rod required to reach from the notch on one side of the block, up and around the anvil and down to the notch on the other side. I then heated each end of the rod thus needed and after heating in the middle put one end into the hole in one end of the 5/6 x 1-inch flat piece, placed it in notch in block and quickly bent around the anvil and down to the other hole in the 5/6 x 1, put on nut, and it makes the anvil as solid as you want it. LUKE BLABEY, Manitoba.

A Question for Mine Smiths.—I would like to have some kind reader of The American Blacksmith oblige me with particulars of how to make a pair of shafts for drawing cars down into a mine, with attachments for holding cars back when going down an incline. I have never seen anything of this kind, but 1 am informed that they are in use in South Wales. At this present day our cars hold from one ton to thirty-five hundredweight, and the horses are of the usual type used in mines. Information in regard to harness and method of fixing the same to shafts and all

concerned will be gratefully received through the columns of your valuable paper. I have derived quite a lot of information from "Our Paper." Widowson, Sask.

Tempering Dies.—In answer to J. F. V., of North Dakota, who wants to know the best way to temper dies after recutting them, I would advise him to use fish oil. Another good method is to use saltpeter, two ounces; common salt, one pound; salammoniac, two ounces, and alum, one half ounce. Powder this and dissolve in two gallons of soft water. This receipt is excellent for tempering plow shares and corn plow shovels. Heat your dies to a dark cherry red and hold in the bath till entirely cold. Don't take them out if they will steam, for they are liable to crack. When cold, polish bright and lay on a hot iron over the fire and draw to a straw color.

C. W. METCALF, Iowa.

Analysis of Good Coal.—I want to order coal of a certain standard, but do not know just what to specify. Could you tell me the analysis of a good coal, especially suitable for welding? M. T. Chabot, Quebec.

In Reply.—The following is an analysis specified by many of the large users of smithing coal:

The requirements of a good smithing coal are: Low percentage of sulphur, moisture and ash and a high percentage of fixed carbon. A low percentage of ash insures a clean, clear, uniform fire. Too much sulphur has a deteriorating effect on iron and makes a good weld impossible, as every smith knows.

The Editor.

Several Questions from Georgia.—I wish someone would give me a remedy for an overreacher and crossfirer, and also tell me what kind of a shoe to use and how to attach same. I am using a heavy shoe in front, cutting down toe under bottom and using a light steel bevel shoe behind. Will this do, and is it a good way to shoe a horse in this case of overreaching?

Also, will some of the brothers give me a receipt for tempering standard coupling springs, and also how to temper them? I have a lot of that kind of work to do. I also want a receipt for tempering cold chisels and cold and hot cleavers, and how to use it for best results. How can I work chisels down for best results?

Will some of the brother smiths tell me a good location for a good blacksmith and horseshoer somewhere in Georgia? It will certainly be appreciated if you will let me know.

G. Q. Morris, Georgia.

A Case of Canker.—I have a horse that has what veterinarians call a canker of the foot. Can any reader tell me if there is any cure for it, and what it is? I would be glad of any information regarding it.

J. Piercey, Ontario.

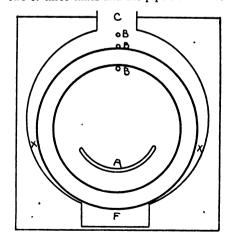
In Reply.—If the case described by Mr. Piercey is canker of the foot, or grease as it is better known, the treatment should begin first of all with cleanliness, not only of the diseased foot, but of the stable as well. Make a dressing of vaseline, one ounce; oxide of zinc, two drams, and iodized phenol, twenty drops. Apply this to the diseased foot after cleaning the parts

as well as possible. Keep the foot as clean and free from diseased tissues as possible when changing the dressing. As the secretions diminish, use a dry powder, such as calomel or sulphates of iron, mixing the latter with powdered animal charcoal in the proportion of one part of the sulphates to nine parts of the charcoal. W. O. Julius.

A Shop-Made Tire Heater.—In reply to. Brother Matson, of Michigan, in regard to building a tire heater. I submit the accompanying engraving and description. We use a heater like the one shown and find that it works very well. This heater may be built in the wall or against the wall and is of brick. The size may be according to the size of the tires to be heated. Our furnace is nine inches in depth. The firebox is shown at F. The space from X to X is filled with wood when the furnace is in use. At A is a piece of sheet iron bent crescent shape to spread the flames so as to heat the whole tire. This piece is as wide as the furnace is deep. At B, B, B are pins or pegs upon which to hang the tires. The chimney is shown at C. The door for this furnace may be arranged to suit the convenience of the user. The door of ours is hinged at the top of the furnace and we lift it by means of a rope and pulley. McGEE & RATHJEN, New Mexico.

Two Useful Kinks.—Here is a tool that I use for welding on toe calks. Take an old buggy axle and square the end to fit the hardie hole, then cut off when you think it will upset to two and a half inches square and five eighths of an inch thick. Then, while it is hot, I take my hot chisel and cut a crease across the upset part to take a sharp toe calk. I take a heat on my calk and turn my shoe upside down on the tool, and two or three good blows will drive it in the crease and it will be half sharpened and won't take long to finish.

Here is another kink for drilling a hole through a brick wall. Take a piece of gas pipe the size of the hole you want to drill and on one end file teeth, not too sharp. Then heat this end to a welding heat and coat with borax. When the borax is melted plunge into slack tub. Repeat this two or three times and the pipe end will be



A TIRE FURNACE

case-hardened. In the other end weld a plug to make a solid end. Don't use too long a pipe. R. C. Collins, Wisconsin.

For Handling Slip Shares.—In answer to Mr. H. A. Henke's inquiry for a device for

holding a slip share under a trip hammer I would suggest the device shown in the engraving. Take two pairs of tongs and weld them together at the handle ends as shown. Then bend at right angles at AA, thus forming double tongs. The width between the tong jaws should be nine or ten inches, and the length of handles would depend upon a man's own convenience in using. I prefer about twenty inches. If a man wishes to lock them it may be done by means of a ring, welded around one side. which may be slipped down to the jaw for release and pushed back towards the outer end to lock. Two rings may be used if preferred. I have found this the most convenient way of holding a share under a hammer, as it can be rested against the body to steady it. F. W. RIDGWAY, N. Dakota.

A Short Letter from Kansas.—I have a shop 24 by 50 feet and do all kinds of smithing, shoeing and wagon work. I have never yet whipped a horse. The way I conquer a bad horse is to feed him sugar and salt by putting it on a plate in front of him and I have shod horses that were very nervous. I shoe regularly a horse that had his eye put out in a shop and I feed him

Prices are very good here, but m is high.	aterial
	e 50
Shoeing, new shoes, each	● .50
Shoeing, old shoes, each	.35
Bar shoe	1.00
Buggy tires, set	4.00
Broad tires	5.00

W. CHAMBERS, Washington. He Can't Afford to Miss it .- I notice in our American Blacksmith that somebody is kicking. I say "Our Paper" for I consider THE AMERICAN BLACKSMITH the smiths' very own. I have been in the smithing business for 17 years and consider myself beyond the average, as I have compliments from far and wide in my county, and have work sent me from all sections, while there are eight more shops in this county. I consider THE AMERICAN BLACKsmith the best helper one can get. It is always interesting because it treats on all smith subjects. In other words, it always has some new dish in its dinner. I think if a man dines on one thing all the time he is liable to become stale on it. And a live man should be able to grasp more than one subject. I do some shoeing, but if I found only horseshoeing discussed in The Ameri-CAN BLACKSMITH, I would drop my part of

put on the rims without breaking the end
of the spokes, as I do not know how to
spring the rims to put in the spokes. Is
there some kind of device for handling heavy
rims? I can handle buggy rims all right.
Perhaps someone can give me some advice.
Will give you some of my prices for work.
Horseshoeing, per set, plain\$ 1.50
morsesmentg, per set, plant 1.50
Tire setting, cold, 4 wheels 2.00
New spoke
New felloe in wheel

I have been able to satisfy the people and

am making very good money. Quite often

I get a job that I hardly know how to do it.

Today I am fitting a three-foot wheel with a half-inch rim. My trouble is how to

In Reply.—Mr. Clark is evidently in need of a tool for putting on rims similar to the device described on page 49 of December, 1905, by Mr. S. P. Thurman.

Another device very similar was described by Messrs. E. D. Bean & Son in the September issue, on page 285. The Editor.

A Letter from Texas.—I am away down here in Central Texas, running a country shop. Robertson County, just adjoining, has better prices than we do. We cannot get organized on a price. Please give some suggestions on that line if you can. I will give you a few of our prices:

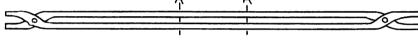
Four shoes\$	1.00
Setting buggy tires\$2.00 to	2.50
Wagon tires	2.00
One half buggy rim	1.25
Full buggy rim	2.25
Buggy stubs from \(\frac{2}{3}\) to 1 inch common	7.50
Buggy reaches	1.25
One shaft	1.50
Cross bars	1.00
Wagon reaches	1.25
All other work in proportion.	

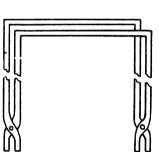
I have a shop equipped with two Weber gasoline engines, one three-horsepower and the other six-horsepower. With my three-horsepower engine I run one Kerrihard Power hammer, one drill press, one emery wheel, one rip saw, a wood-turning lathe, a pump for an eighty-foot well elevating to tank thirty feet in the air. The six-horsepower engine runs a mill and makes from eight to ten bushels of meal per hour. I have the best equipped shop in Milan County.

G. N. SMITH, Texas.

About Rock Drills and Shoeing .- I am very much pleased with "Our Journal" and find many useful hints in its columns. I saw in one of the numbers where someone asked about tempering rock drills. The writer doesn't state whether machine or hand drills, but it does not matter much. I have had a good deal of experience in hand drills and I find that the trouble with tempering drills is caused through putting the drills too far in the fire and getting them hot too far up, which causes them to break just above the bit. They should be heated only just at the end and never temper from the fire but from the hammer, and use clean water for very hard ground. The bit drills should be a shade full in the center and a very short bit just according to the rock you are boring.

I have not seen anything in the journal





FOR HANDLING SLIP SHARES

silva and panelli some of my price	
New shoes	\$.35
Wagon tongue	2.50
Axles \$2.50 and	
Bolsters	1.50
Sand boards	
Spokes and felloes	. 15
Buggy rims	1.25
Setting tire	. 50

I have learned to take the dish out of a buggy wheel without taking the tire off.

Daniel Johnson, Kansas.

A Note from Washington.—I would like to see an issue of our paper given over to the steel question. I believe I could learn something more about steel.

Now about my side line, I haven't any worth mentioning, (?) only a Sunday School which was organized in my shop August 2d, 1908, and is being continued until we can afford a more suitable place for it. I would like to know if any other brother ever organized a Sunday School in his shop. This is a new town and there was no other place available so we just have Sunday School in the shop and use the I renton anvil for a bell.

I enjoy the letters from the foreign countries but wish they would write more.

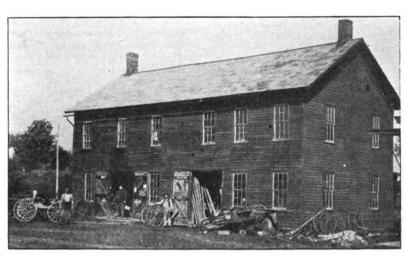
it and would kick from the other way. I took a course in the shoeing school established in Colorado. I consider The American Blacksmith good for every man who is up to date. I can't afford to be without it, so let it come the same route it has been coming.

E. Keen, Florida.

Hot or Cold Fitting.-I have just read some interesting letters on hot and cold fitting. One man says he doesn't believe that a man who is a cold fitter can detail the anatomy of the horse's foot. I think he is off, for I know some very good shoers that can give the anatomy of a foot and that practice the cold fitting. The way I do is to be governed by the conditions. If the foot is uniform and healthy I fit the shoes as near as possible to the shape of the foot. Then, if they don't fit exactly, I can change them easily on the anvil. If the foot is hard and dry, put linseed oil on and rub it in with a warm iron (not too hot). As to the toe clip; down here in Arkansas, if a horse wears toe clips, it causes separation or a cracked hoof. This is due to the climate and water, which I cannot explain, but I have tried the experiment. I like the clip, though, and sometimes put side clips on a crippled foot. But I don't keep up the practice long enough to have bad results. We use a six-horsepower International engine and it is handy. make new wagons and buggies and anything else that anybody wants. Let's hear from others. H. T. FINNEY, Arkansas.

A Question and Some Prices.—I am a subscriber of your Journal and think it a fine book. I was raised here in New Mexico and I was in the ranch business until three years ago, when this country began to settle up. As far back as I can remember I could work with iron quite well and now I am running a country blacksmith shop, where I do nearly all kinds of repair work. All I know about blacksmithing and wagon making I have learned by myself. So far,

about flat and beveled shoes. I believe in beveled shoes, but I find a great many differ in opinion on this subject. I would like to hear from some of the first-class ones on this subject. If a horse is used to beveled shoes he will certainly go lame with not burn it. When that is burnt off, add one more spoonful of sulphur. Then put the shoe on with a piece of light sole leather under it to keep the dirt out and the horse will never go lame. This is a very simple remedy and quickly done, and I have as



THE YORK STATE SMITHY OF O. B. WOODART

flat shoes. But if a colt were shod for the first time with flat shoes I believe they would be the best. It seems more like nature to me. E. J. Rootsey, Australia.

A York State Smithy.—The accompanying engraving shows the front view of my shop. This shop is a two-story frame structure, 25 x 52 feet, with a slate roof. It consists of a blacksmith and wagon shop on the ground floor, above which are the painting and show rooms. Our business was established by my father in this village in 1841, and one building was destroyed by fire in 1874, when this present building was erected. I worked with my father until his death and began when I was thirteen years old and am now sixty-seven. My brother, Alonzo B. Woodart, and myself now carry on the business together and have for the past thirty years. Our firm is the oldest established in Herkimer County, New York. Our specialty is farm wagons, bobs and sleighs.

OSCAR B. WOODART, New York.

Curing Bruises and Punctures.-I want to tell Brother William Lindsey a much easier and better way to cure a horse's hoof when there is a bruise, a cut or puncture either by a bolt or nail in the bottom of the foot. I have just read his letter in your most valuable paper. I have never failed on curing any horse and the owner need not lose one minute's work on the horse on account of any sore that might be made by a nail or bolt in the foot. First, pull the shoe off, if the horse has one on, and then take your paring knife and cut out around the wound clear into the pulse or as all blacksmiths call it, the quick. Cut out a hole the size of the end of your thumb. Prepare your shoe the same as you would any ordinary shoe as if there was no sore. Then get a small shovel full of hot coals and hold the horse's foot over the shovel of fire. Be careful not to burn the hoof. Now put about two tablespoonfuls of sulphur on the coals and let it burn under the part that is sore, keeping the foot as close as you can and

yet never known it to fail in curing a case, and I have a great deal of shoeing to do.

W. H. Spicer, Kentucky.

A Letter from New Zealand.—Our legislators have been trying to frame up an act to try and remedy bad shoeing. Some of the arguments in the discussion of the act are very "namby-pamby." We—our union—intend petitioning the House to appoint qualified farriers to inspect, teach, and instruct those needing it. In every district there is at least one smith who is head and shoulders above his fellows. Horses are brought to him from far and near. He can make a horse travel sound, cures forging, and other ailments, in fact, makes a useful animal out of a previously

horse that makes all toe and no heel in most cases is lowered at the heel still more, making the foot worse and throwing all the strain on the back tendons, the heel and the plantar cushion. This causes corns by not giving the horse sufficient depth of heel to prevent bruising and to lessen concussion. In my thirty years of experience as a horseshoer I have always, and with success, lowered the heel of a high-heeled horse and shortened the toe of a low-heeled animal. New Zealander.

A Talk on Shop Insurance.-You are generally aware that a blacksmith shop carries a high rate of insurance, yet it is very seldom that you hear of any shop burning, unless it is set on fire or gets afire from some other fire. Now, the insurance companies will take the risk on a lumber yard or some other building that always sets things on fire. Now, I think a mutual insurance among the smiths would be a good thing and cheap. All to pay for the risk of any one. Say, for instance, we have a county organization and the counties in a state organization; let every state be independent, but made up of county organizations; the shop and heavy tools owned by the smith must be worth \$500.00 before one can take out any insurance. If one has a fire and the shop burns from an inside cause \$.50 on a dollar is to be paid; but if it burns on account of some other fire near by, \$.75 on a dollar can be paid, and in no case can the money be used unless to replace the shop with a new building. This will keep him from burning out and losing the place; and where a man has a sideline, it must not be in the policy—just the shop and tools. If he wants insurance on sidelines, he must use old-line insurance.

The twenty-fourth of December, last, I lost all I had on earth by fire from a lumber yard. The insurance company valued the yard at two cents on the dollar and my shop, which was close, was five and one half cents on the dollar, and the lumber yard was



ANOTHER YORK STATE ESTABLISHMENT

useless one. These are the men who should be consulted. They are the men to suggest proper methods of shoeing and the preparation of the foot to receive the shoe. It is enough to make one's heart bleed to see the manner in which a large number of horses' feet are allowed to grow. There is little or no attention paid to cutting them to a proper angle so as to balance the horse fairly on his feet. A

burned first. Fire broke out in the lumber yard and destroyed the whole block. I lost \$2,000, saved \$700 worth of heavy tools, but I never got inside of my shop. Now, if we had an insurance of our own I could have had enough to rebuild, but, as it was, I carried no insurance, so it was a clean loss to me. I would like to hear from other smiths on this point. What say you, brother? OSCAR R. MANVILLE, Missouri.

LIGHTNING **GASOLINE**



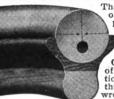
ENGINES

Steam Cooled Double Piston No Foundation

Send for Catalogue **Showing Superior** Points, and get Prices

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This Cushion Tire is Made of New Rubber!



That's one reason it wears so much longer than others. The rubber we use is quoted at \$1.20 per pound today. We could make tires of old rubber "reclaimed" from the junk pile that costs 10c a pound, or "Lapori" and "Guayule" that cost 35c a pound, but that kind won't do for a Good year. This is the Eccentric Cavity Cushion Tire with canvas guides—a special point of Goodwar construct.

of Goodyear construction. You can't get
this Goodyear Tire on
wrong. The hole-belowcenter takes the wire outside the zone of motion
and prevents wire cutting. Every user can see the advantage of the Goodyear at once.

year at once.

Write for booklet on Cushion Tires, explaining construction in detail.

Ask for sample section of tire. Do it today. A postal will do.

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Are fireproof, stormproof, and offer sure protection against lightning. They are Galvanized after Embossing, hence never crack or scale, and last a lifetime with no further attention after having been once laid. Inexpensive and Handsome, and afford an Ideal Roofing for all kinds of roofs, especially so for pitched ones. No soldering, only nails and hammer required. Write to-day for our illustrated catalogue; sent free. Mention American Blacksmith.

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Our Trade Mark Represents the only Tool required to operate the

BRADLEY Ball Bearing Shaft Coupling.

A left hand will do as well. We are willing to hold up our right hand and swear that we are the original makers of a Ball Bearing, Leather Packed Shaft Coupling, that Bradley Couplings are Drop Forged from Bar Steel, are Silent. Quick Shifting, Self Lubricating, Automatically take up their own wear and will outwear any vehicle to which

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C. C. Bradley & Son,







Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, Jan. 4, 19.9, and are subject to fluctuations. Corrected for The American Blacksmith by The National Heavy Hardware Reporter, Chicago.

Correspondents report no changes in prices	١,
Horse Shoes— All Iron Shoes Steel Shoes No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	\$4.40 4.25
Mule Shoes	4.90
Featherweight Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Ideal Counteraunk	6.00
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
Track Weight	9.50
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Merchant Bar Iron-				
\$1.90 to \$2.10 rates	full extras.	and 20	cents p	oer.
100 pounds extra	for broken	bundles.		

Per box.

Steel Bars— \$1.90 to \$2.10 rates, full extras.

Toe Calks-

Blunt Sh a rp	\$1.30 1.55
Carriage i 6 x i ar Larger	olts— 60–10% d smaller
Machine l 4 x 1 aı Larger	olts— d smaller
Nuts—	un 10 lbs. of a size \$2.50 off

Less than 10 lbs. of a s From 10 to 50 lbs	size
Washers— Same price as nuts.	Skeins— Cast 65%
Maileables— Common \$.09	Half Patent Axles — 65%
Springs— Single Spring, each Springs, black and half	\$1,25 bright .06
Hickory Lumber-Per Fo	oot—

Ash and Oa 1-11 11-2	\$.07½ .08	Foot 21-3 31-4	_ ::::::::	\$.081 .091
Yellow Por	lar Lumi	ber—P	er M.	Feet—	
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i"		. '	85.00		80.00
1.		. (88.00	75.00	85.00
; ; ;}			72.00	80.00	104.00
Rough Hic	kory Axl	es			Each.
3 x 4	6 ft	. .			. \$.60
34 x 44	6 ft				. 1.00
4 x 5					. 1.20
5 x 6					. 2.20

3 x 4	6 ft	.				. \$. 60
31 x 41	6 ft					. 1.00
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Rough Oak Wagon Tongues— 4 x 4 x 2 x 4 x 12 and smaller

Finished Oak Wagon Tongues-

T	wo Inch Saw	red Hounds		Per 1	Pair.	
	Tongues				.40 45 .55	B
P	Hind	ls—				_
	A. B. No.1 D. No. 13	3 and under.	33 1 Larger	3	0 %	_
	All Grades, All Grades,	No. 17 to No. 39 and	l Larger	35	0 %	ı
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	Plow Beams	;— 			\$.70	-
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	Oval Plow 21 x 36" 3 x 40" Wagon Do	\$1.60 1.70 1.80 2.45 2.50 2.65 S—Round—	sond Growth 8 \$2.90 2.95 3.05 3.55 4.00 - Forest 2.10 2.15 2.15 3.45 - It x 3	\$3.66 \$3.66 3.84 4.22 4.8 \$Second (\$3.6 3.6 3.7 4.2 4.8 \$V Double \$ x 42"	irowth)) 5 Growth 0 5 5 Contract 5 0 trees— \$3.00	5
	Oval Plow 21 x 36" 3 x 40" Wagon Do	\$1.60 1.70 1.80 2.45 2.50 2.65 S—Round—	sond Growth 8 \$2.90 2.95 3.05 3.55 4.00 - Forest 2.10 2.15 2.15 3.45 - It x 3	\$3.66 \$3.66 3.84 4.22 4.8 \$Second (\$3.6 3.6 3.7 4.2 4.8 \$V Double \$ x 42"	irowth)) 5 Growth 0 5 5 Contract 5 0 trees— \$3.00	5
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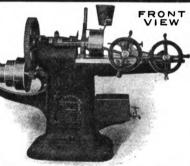
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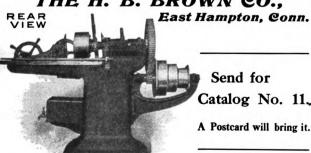
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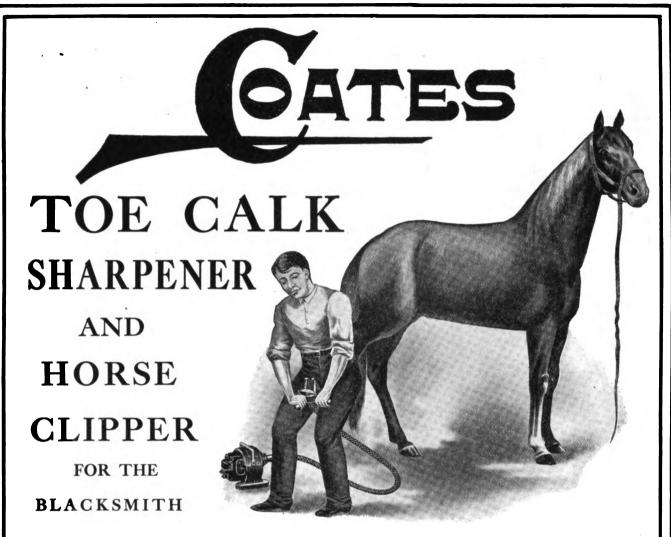
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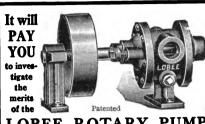


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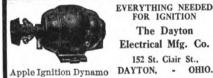
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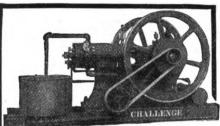
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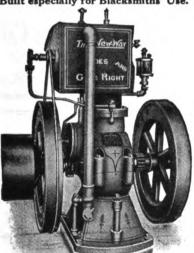
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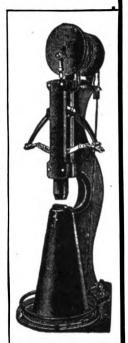
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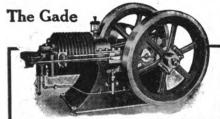
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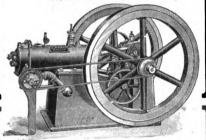
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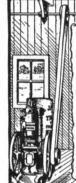
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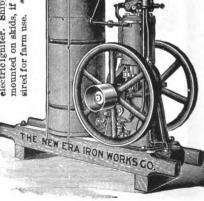
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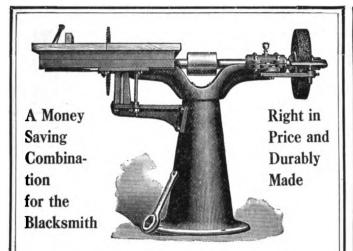
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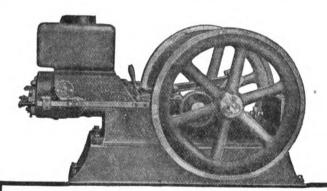


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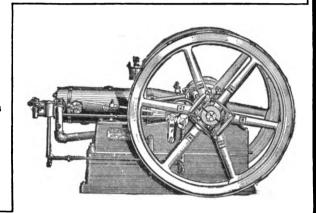
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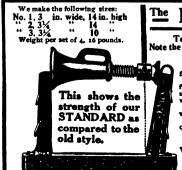
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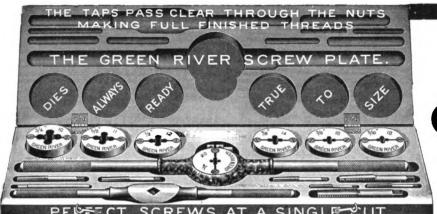
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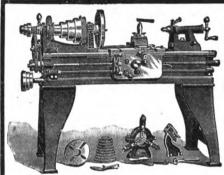
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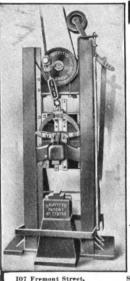
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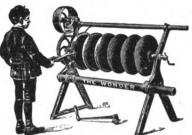
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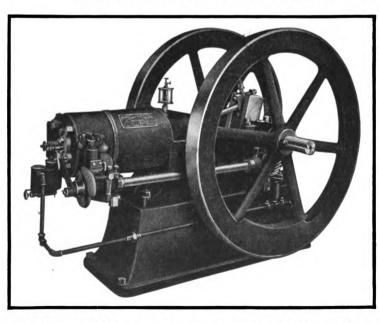
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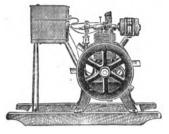
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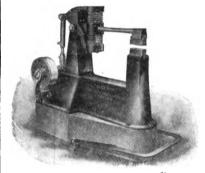
BLACKSMITHS' HOOK AND HANDLE RULES

Made from hard rolled sheet brass, one-tenth inch thick, one and one-sixteenth inch wide, with heavy gradations and figures, graduated from the end in sixteenths of an inch on one side and from the inside of the hook in sixteenths of an inch on the other, adapting them for taking correct measurements from either the outside edge of a hot piece of iron, or from the inside when held against a corner. Graduated twelve inches, have fiat handles and measure over all sixteen and three-fourths inches.

Price, postpaid, \$1.15. Catalog No. 17 AH of fine Tools free.

The L. S. STARRETT CO., ATHOL, MASS.

THE DAYTON



CUSHIONED HAMMER HELVE

A First-Class, Medium-Priced Machine. The Best Helper for Your Shop. Will Soon Pay for Itself.

SEND FOR CIRCULAR.

The Foglesong Machine Co., 129 RINGGOLD STREET. Dayton, Ohio.

NEW FOR THE CARRIAGE BUILDER A Labor Saver. A Money Maker. A Time Saver. A Wonder Worker. Look at this new wood-working machine—examine it carefully—see the many different kinds of work it will do for you in one-fifth of the time it takes you to do it now. This machine is a band saw, rip saw, cut-off saw, planer, lathe; with it you can tenon spokes, bore weeel rims and tires, and do a dozen other wone it block. A four horse power engine repair jobs will run Put one in your shop at once. Increase your Profits. DESCRIPTIVE CIRCULARS FREE. machine easily WRITE US.

HAGAN GAS ENGINE & MFG. CO., WINCHESTER, KY.



4,000 Pounds

the guaranteed capacity of this wagon.
It is equipped with
ELEOTRIO STEEL WHEELS
ith stagger oval spokes, broad tires, etc.
It has angle steel hounds front and
construction of the stagger oval spokes, broad tires, etc.
It has angle steel hounds front and
construction of the stagger oval spokes, etc.
It has angle steel hounds front and construction of the stagger of the stagger oval spokes, etc.
A pair of these wheels will make a pair of these wheels will make a pair of the stagger out of your old one.
Send for free catalogue and prices.
Electric Wheel Ca. Roy A. Oulsey. Iti. Electric Wheel Co., Box A. Quincy, III.

HORSE SHOE BAR IRON

-MADE BY-

The Milton Mfg. Company,

MILTON, PENN'A.

Is of Superior Strength and Quality. We can prove it. Write us.

Trade Literature and Notes.

A NEW CATALOG has been issued by the Wiley & Russell Manufacturing Company of Greenfield, Mass., U. S. A. It illustrates their large line of Patent Machine Relieved Taps, Green River and Lightning Screw Plates, Reamers and Blacksmith Tools. It also contains many tables, rules and other knowledge that is invaluable to all blacksmiths and repair men. It is called No. 34. The manufacturers wish to call the attention of blacksmiths to the fact that they have made a general reduction in price on all the screw plates so that their high quality screw plates can now be secured at the same prices as other makes. This catalog can be obtained by all who wish it on application.

can be obtained by all who wish it on application.

THE COATES CLIPPER MFG, CO. have just put on the market an electric flexible shaft-driven too-calk sharpener. This is an entirely new and ingenious device, designed for horse-users in the Northern cities, where horses have to be sharpened constantly to prevent them slipping. This can be used with equal facility on the old standby calk that is made on the shoe, or on the inserted calk.

It consists of an emery wheel running on the end of a flexible shaft, covered with a guard and equipped with a pair of handles so that the operator can grind the calk very readily. The sharpening device can be inserted instantly.

This also has been used with great success for polishing up brass work on automobiles and brass work on harnesses. It has found particular favor in the fire, police and hospital service in Northern cities, as it puts the service to the highest point of efficiency, and it is ready to meet any emergency.

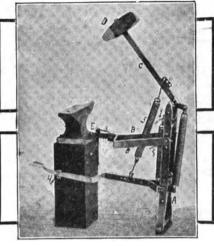
Anyone at all interested in this device will do well to get into communication with this company at once. Their advertisement will be found on another page.

another page.

another page.

A NEW WRENCH that fills a long-felt want for a handy and quick acting tool in this line has just been placed on the market. It is called the WIZARD and is claimed to be the only practical adjustable ratchet wrench ever produced. It can be operated like an ordinary wrench or ratchet, with right or left action, being changed to operate right or left by giving the knob in handle a half turn to reverse the pawl. The wrench is both novel and useful and is constructed with a view to the greatest strength and durability.

It is especially adapted for use in close quarters where no other wrench can be used. For automobiles, engines and machinery of all kinds it is especially convenient, also for work around pulleys. When applied to the nut the wrench need not be lifted until the nut is turned as much as desired. It combines all the good points of the monkey



Will strike light or heavy as desired, is easily operated and is always ready. Special price for the next 30 days. Write at once for circular and price to AUG. S. LOCKREM. Pierpont, S. D.



AGENTS EVERYWHERE SELL STICKNEY ENGINES Charles A. Stickney Company



wrench in addition to the ratchet feature, and is operated with one hand. The machinist, repair man and farmer will find it a very valuable addition to his tool kit.

The wrench is made of the best quality of drop forgings; surface is polished and hardened; mottled finish; all parts interchangeable and every one guaranteed. The eight-inch size is illustrated herewith. Other sizes will be added to meet the demand. The jaws in this size open one inch and

quickly adjust to suit any nut up to this size.

The manufacturers say that they have already sold several thousand of these wrenches, and the general interest shown by the trade clearly demonstrates that there is a popular demand for a practical, adjustable ratchet wrench. They are sold by hardware and supply houses. Printed matter and prices will gladly be furnished by the manufacturers. When writing, address The Richards Manufacturing Company, Aurora, Ill., U. S. A.

The Modern Foot-Power Hammer | HOW TO RUN AN AUTO



"Homans' Self Propelled Vehicles' gives full details on successful care, handling and how to locate trouble.

Beginning at the first prin-ciples necessary to be known, and then forward to the princlples used in every part of a Motor Car,

It is a thorough course in the science of Automobiles, highly approved by manu-facturers, owners, operators and repairmen. Contains over 400 illustrations and diagrams, making every de tail clear, written in plain lan-guage. Handsomely bound.

PRICE \$2.00 POSTPAID

SPECIAL OFFER

The only way the practical merit of this MANUAL can be given is by an examina-tion of the book itself, which we will submit for examin

tion, to be paid for or returned, after looking it over. Upon receipt of the following agree-ment, the book will be forwarded.

NO MONEY IN ADVANCE RE-OUIRED. SIGN AND RETURN.

Theo. Audel & Co., 63 Fifth Ave., New York Kindly mail me copy of Homans' Automobiles, and if for satisfactory, I will immediately remit you \$2.00, or return book to you.

ADDRESS

SENGO" 3 H. P., \$110 5 H, P., \$150

Write for Trade Dis-counts and Catalog "S" Shadegg

Engine Company, Minneapolis. Minn., U.S.A.





Copyrighted 1906 by A. Rosenberg. Established 1894

This Ad is Worth \$1.00 to YOU.

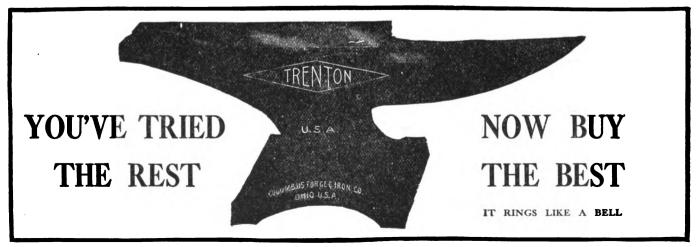
with this out and send it together with the balance of the amount of your order allowing 5; for this ad. This motor eperates by water for grinding all kinds of tools, drills, etc., and can be fastened to a spigot or screwed to a stand.

Price \$5 for the motor, sgc.

Price \$5 for the motor, sgc.

Price \$5, for

THE A. ROSENBERG MOTOR & MFG. CO. (Mention Am. Blacksmith)







Build Your Own Incubators and Brooders



and save half the purchase price. Any one can do it with my plans. I furnish the mechanical parts, Lamps, Regulators, etc., at low prices. My New Burner, Tandem Thermostas, and Special Hester, will save half the oil, half the time, and cost of operation. Fit any Incubator or Brooder. More than 25,000 have built their own Incubators and Broodrage with my plant and fixtness. Not a single failure. My New LAMPLESS BROODER costs pround; providing with my journ of complete the control of M. SHEER, 515 HAMPSHIRE STREET, QUINCY, ILL.

THE PERFECTION

is a device that attaches to emerystand. It will sharpen any size disc speedily and perfectly. A complete success. None better. Cost small. Shipped on trial. Thousands in use. Write today, to

R. M. HAMMOND CO., Delivale, Kans.

Shoe

BRAZING SLEEVES For Putting on Rubber Tires No Filing or Scarfing

LINED UNLINED WHITE,
111 E. Pearl St., CINCINNATI, OHIO.

The New "Burlington"

The Roller Motion Four-Calk Heel Weight Horse Shoe

Prevents stumbling, forging, bruising and cutting the

Prevents stumbling, forging, bruising and cutting the quarters.

Quickens the action of the front feet, produces the desired fold of the leg and higher knee action.

Is a great help to all horses with sore and tender feet.

Decreases the strain of the nails on the hoof.

Made of best quality toe calk steel, in sizes 1, 2, 3,4—three weights to each size.

For sale by Beck & Corbitt, Iron Co., 1238-1246 North First St., St. Louis, Mo.; Rob't Donahue Iron & Hdwe, Co., Burlington, Iowa, and other leading jobbers. If yours cannot supply you, write us direct for prices and we will supply you promptly.

The Burlington Horse Shoe Co., Mfrs., Burlington, Ia.

THE REYNOLDS AXLE GAUGE

SIMPLE

ACCURATE

DURABLE

Patented April 29th, 1902. Made solely by Cray Bros., Cleveland, O.



Throw away your old straight edge and use this reliable gauge. No more guesswork. This gauge registers the exact amount of set or gather on indicator plate in plain inch measure. Sold on a positive guarantee to give satisfaction or money back. Special inducements on this gauge to hardware jobbers.

Write for prices and get our complete 304-page net price catalog.

CRAY BROTHERS,

(Dept. A.)

CLEVELAND, OHIO



FORGED BUTCHER KNIVES

Blades Made Expressly for the Blacksmith

Forged by hand from the best crucible cast steel, tempered and ground ready for use with handle ready to put on for 15 cts. each or \$1.50 per doz.; \$10.00 per 100. Knives furnished complete, no marks or brand, for 30 cts. dozen extra. Assorted sizes and styles. Drove tang and riveted same price to 8 in. We will replace any imperfect knife with two good ones. Hundreds of smiths are using these blades and are making money and thing the strength of the strength friends selling them. Try a sample.

Hand-forged razors all ready for use, warranted best quality, 50 cts, each. Pocket knife handle and steel to make blade of, 10 cts, each.

WOODWORTH KNIFE WORKS

Established 1876

NUNDA, N.Y.

HORSE RASPS That Are Superior

Best High Grade Steel.

Hard, Thorough Temper. Sharp Cutting Edge.

Sharp, Strong Teeth, Well Backed.

They Are Warranted USE NO OTHERS

Made in all regular sizes, and in the new 18-inch Slim, which gives the user the advantage of a long stroke, and at the same time a rasp of medium weight.

YOUR DEALER FOR THEM

Prof. GEO. E. RICH

SENDS GREETING

I desire to extend to all craftsmen my best wishes for a happy and prosperous 1909.

I want to do all I can for everybody especially during the first part of the year.

I will give everyone who wants to take advantage of this low price, my mail course in horseshoeing of ten lessons, one copy of my new book, "Artistic Horseshoeing," latest edition, together with a diploma, for \$8.

This offer is only good for 60 days from January 1, 1909.

Now is your time to get my whole life experience for \$8.

Book without mail course is \$2.

Send the amount in a registered letter, or by money order, and I will forward the book at once, paying postage.

Any one who has my book of 1904 or 1907, and wants the mail course and diploma, can send me \$6 and I will send at once, but these orders must be mailed to me within 60 days to get this low price.

Here is what some of my students say:

From Sherm Z. Bahr, Dushore, Pa.

"I came to Prof. Rich to learn how to make and shoe a horse. I have been with Prof. Rich, taking his course in horseshoeing, for 40 days, and have made 20 different kinds of shoes, and can fit, shoe and treat the different diseases of the foot. I can recommend him to everyone."

From B. A. PEERY, Pittsville, Mo.

"I thought I knew something about shoeing horses, but after reading your instructions! see that I did not. I received mylesson book and diploma and am proud of them."

From Jackson Stewart, East Jordan, Mich.

"I am well pleased with the corresponding course in horseshoeing I took from you. I shod horses for years without knowing anything about my trade, although I thought I did."

WRITE AT ONCE TO

Prof. Geo. E. Rich, Akron, Ohio, U.S.A.

Valentine's Hoof Packing is the Best and Cheapest Packing Made.

1st. Because you use but 1-3 the quantity as you would of any other packing made, and horseshoers will find that a 10 pound bucket is equal to 25 pounds of any other packing made or money refunded.

2nd. Users are guaranteed that the ingredients used in this packing are in no way injurious to the sole bars or frogs.

3rd. Valentine's packing will not run or ooze from under the pad in hot weather and no oakum is needed except to exclude dirt at the heel.

This packing is guaranteed to soften any dry, hard sole and render it tough and flexible. After its use the foot can be easily trimmed out with a knife and the sole will be found in perfect condition. This packing is prepared by W. F. Valentine, a Practical Horse-shoer who is also the discoverer of the well known Valentine Hoof Ointment and Coronary Blister.

The Valentine Remedies are for sale by all dealers in Horse-shoers' Supplies, and money refunded if not satis-

Freight paid on orders accompanied by cash, where there are no dealers. Address

The Valentine Hoof Ointment Co. Circleville. Ohio.



IT FITS IN

Wherever There's A Forge

WHETHER you are a horseshoer, a blacksmith or a vehicle worker, you need

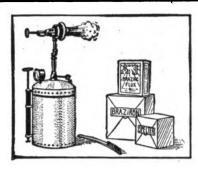
THE AMERICAN BLACKSMITH "IT FITS IN WHEREVER THERE'S A FORGE."

It will show you how to save money—how to make more money—how to earn more. It will give you practical, interesting, money-saving, profit-increasing information that you can use today on today's work. It is an every-day, righthand helper for the man on the job. It puts you onto all the newest wrinkles in the craft. It's not the social news you want, nor the political news. It's the sound, solid, practical, money-worth information about your trade that you want, and you get it in

THE AMERICAN BLACKSMITH "IT FITS IN WHEREVER THERE'S A FORGE."

Can you afford to do without such a magazine? Every line of every page of every issue is a vital reason why you should subscribe. A whole year's subscription—twelve numbers—will cost you but \$1.00, and if you can't get \$25.00 worth of you can secure a genuine safety razor with seven sharp blades, at no further cost, if you will send in your dollar and subscription order NOW. See page opposite, then send in your subscription order and get a safety razor and The American Blacksmith for a year.

American Blacksmith Company P. O. Box 974, BUFFALO.



INCREASE YOUR EARNINGS

Brazing cast iron will increase your business by enabling you to do work you cannot handle now. There is more profit in this additional business than in any other work you are now doing.

INVESTIGATE OUR PROCESS

We give you all necessary instructions, supply all the materials and full shop equipment, if desired.

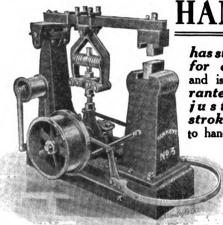
Write for full information. We can supply you through your jobber, if you prefer, as our goods are handled by the leading supply houses.

THE A. & J. MANUFACTURING CO.

18 to 30 W. Randolph St.

CHICAGO, ILLINOIS

THE HAWKEYE



HAMMER

has stood the test for eight years and is fully warranted. No adjustment of stroke required to handle work from

NEW IDEA

plow sharpening to welding $2\frac{1}{2}$ round or square steel, but, our hammers have the

adjustment just the same and it is a mighty good thing to have for extraordinary work such as our hammers will handle. Remember it costs you nothing extra. Why not have it?

We build them in two sizes. The anvil block is set independently, thus taking the strain off of the hammer and preventing the breakage of large and expensive parts.

Write any Jobber or the

HAWKEYE MFG. CO., CEDAR RAPIDS. IOWA.

Free A GOOD SAFETY RAZOR

THE greatest home comfort for any man is a good safety razor. The New Idea "Burham" is a fullsized, genuine safety razor, that will insure ease and comfort in shaving. You cannot cut yourself with it, and will be able to shave in about one-fourth the usual time. Of course, it is

not to be compared with the expensive five-dollar outfits, but the "Burham" outfit consists of one highly finished plated holder and seven sharp "Burham" blades, all packed in a neat imitation leather box with a hinged cover. The blades are carefully packed in oiled paper and tinfoil, thus insuring their reaching you bright, clean and in good condition for shaving. No honing or stropping required to enjoy a good, clean shave. Just insert a sharp blade in the holder and shave.

YOU CAN GET ONE of these razor outfits FREE by sending your dollar for a year's subscription to *The American Blacksmith* NOW. Just look over the pages of this issue and get an idea of what you are missing by not being a regular reader.

IF YOU ARE A REGULAR READER of the paper, get a brother smith to subscribe and order a razor for yourself. You know what *The American Blacksmith* is doing for you and its thousands of other readers. Tell your neighbor smith, get his subscription order and we'll send you a safety razor for your trouble.

THIS OFFER IS NOT GOOD ON RENEWAL ORDERS. PLEASE DON'T ASK US TO BREAK THE RULE.

American Blacksmith Company
P. O. Box 974

BUFFALO,

N. Y., U. S. A.

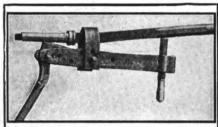




Modern Power Hammer

The ONLY hammer on which you can get a LIGHT BLOW at FULL SPKED. The shifting lever controls the length of stroke. Set it in any one of the five notches and then handle the hammer with the treadle the same as any other. Actually five hammers in one. WRITE ANY JOBBER OR

The Grinnell Mfg. Co., Grinnell, Ia.

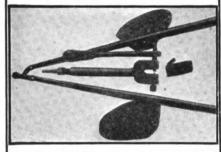


CRIPPEN'S New Auto and Buggy Axle Straightener the qulekest known method; no wrenches, no taking out axle, no defacing paint; just slip it over the axle on either side, push or pull on lever and take up with hand screw which shows you each pull just what you are doing; power unlimited. For autos, pull pin in strap and replace same round axle bask of the fork. Weighs 24 lbs. warranted a lifetime, and \$5.00 cash takes it.

H. M. CRIPPEN ATHENS, OHIO

CRIPPEN'S New Combination Hand Punch and Leather Riveter will remove rivets instantly from bows, and cut to length the new one to be put in. Punches holes in steel 1-8 thick as shown, has special steel top nut wrench, forms Felly bushings for rattling spokes, and puts rivets into shoe soles that cannot come out, hardly wear out. Weight 4 lbs., warranted to please. \$3.50 cash with order.

Wanted; Agents for these specialties.



CLASSIFIED BUYER'S GUIDE.

To Find Address of any Firm given here, consult their advertisement. For its location in this issue, see Index on Page 27.

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Columbus Anvil & Forging Co.
Columbus Forge & Iron Co.
Eagle Anvil Works.
Hay-Budden Mfg. Co.
Wiebusch & Hilger.
Peter Wright & Sons.

Axles.

National Tubular Axle Co. Timken Roller Bearing Axle Co.

Axle Gauge. Cray Bros

Axle Nuts.

Hardware Co. Axle Setters.

H. M. Crippen. Bar Cutting and Bending Machines. Commercial Manfg. Co.

Blacksmiths & Wagon Builders Tools & Supplies.

ers Tools & Supp Beals & Co. Buffalo Forge Co. Campbell Iron Co. Canedy-Otto. Champion Tool Co. Cummings & Emerson. Heller Bros. E. F. Reece Co. Silver Mfg. Co. Wells Bros. Wiley & Russell.

Blowers.

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Carolus Mfg. Co.
Chambers Bros. Co.
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H. K. Porter.

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Drill Chucks. Detroit Twist Drill Co.

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Hammers.

Horseshoes.

Horseshoe Nails.

Horseshoe Pads.

Horse Stocks.

Hub Borers.

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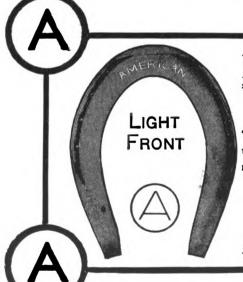
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Incubators.



Horseshoes of all Descriptions

The most complete line for you to select from. Material and workmanship guaranteed to be the best. Our shoes always give satisfaction.

The best Horse Shoes in the land bear this trademark, the stamp of quality



Find this trade-mark stenciled in red on all kegs and boxes

COMPLETE CATALOGUE FREE Showing all Styles of our Shoes

AMERICAN HORSE SHOE COMPANY

Phillipsburg, N. J.

U. S. A



Iron. Bourne Fuller Co. Campbell Iron Co. Milton Mfg Co.

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rarry Mig. Co.
Pioneer Pole and Shaft Co
Power Hammers.
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Star Foundry Co.
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W. A. Jones F'dry and M'ch. CoPulley Breaking Bridles.

Pulley Breaking Bridles.
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Punches.

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H M. Crippen.
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Rules. L. S. Starrett & Co.

Saws, Band. Crescent Machine Co. Sidney Tool Co. Silver Mfg. Co.

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Wiley & Russell Mfg. Co.

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Shaft Couplings. C. C. Bradley & Son. Richard Eccles Co.

Shafting. W.A Jones F'dry and M'ch. Co.

Shears. Bertsch & Co.
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Buffalo Forge Co.
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Tire Heaters. Rochester Tire Heater Co.

Tire Setters.

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Tire Shrinkers, Buffalo Forge Co.

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Buob & Scheu.
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Cleveland Twist Drill Co
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Morse Twist Drill & Machine Co.
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THE **MONARCH** DISC SHARPENER



This Wonderful Machine

is a big money maker and time Every up-to-date repair shop should have one.

Operates by Hand or Power

It is the strongest, simplest and easiest running machine. Sharpens the hardest and rustiest blades. The only machine built strong enough to sharpen disc plows. Makes knife edge without emery wheel

Guaranteed to Give Satisfaction

or can be returned at our expense and money refunded. Designed by a practical blacksmith and manufactured by the oldest and largest Iron Works in the West. Write for interesting descriptive circulars and price.

MURRAY ТНЕ IRON WORKS CO. Burlington, Iowa, U. S. A.



NATIONAL TIRE BENDING MACHINE

for rolling steel and from thre for wheels to a circle of any desired diameter. It will bend thre from the lightest to 10° wide by 1° thick. Is heavy and well proportioned, and capable of doing all the work desired on a machine of this kind. Furnished with tight and loose pulleys, or with friction clutch pulley if desired at a small additional charge. We also manufacture solid steel loose collar axles and the National self-oiling tubular axles and steel stock and hog troughs. WRITE FOR CIRCULARS AND PRICES.

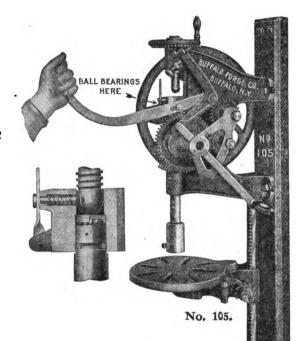
NATIONAL TUBULAR AXLE COMPANY, EMIGSVILLE, PA.

HELLERS' CELEBRATED AMERICAN HORSE RASPS will save you Time and Money. Their Superior Quality sets a known and tested Standard of Enclance. All made from our own Production of Special Refined Clay Crucible Steel and tempered by a Secret Process, New Catalogue Malled Free on Application. Wear That Fools "H. P. DRIVING HAMMER." HELLER BROTHERS CO., Newark, N. J., U. S. A.

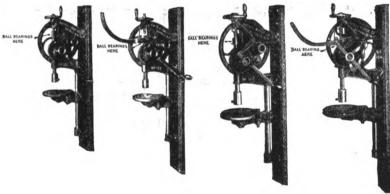
Buffalo Ball Bearing Drills.

Latest Patterns.

Strong Simple Durable



Ball Bearings Placed at the Point of Highest Speed.



No. 101.

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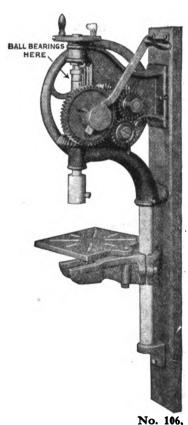
No. 103.

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THE 100 SERIES

Six Up-to-date **Machines**

WRITE FOR PRICES.





All parts jig-made and interchangeable. thrust to cause friction. No Babbitt linings to wear out. Two speeds. Automatic and Hand Feed.

BUFFALO FORGE COMPANY. BUFFALO, N. Y., U. S. A.

1874

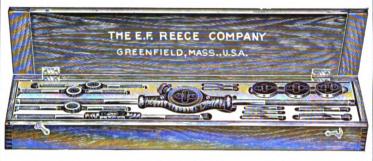
HERCULES

1909

WE MAKE THE BEST

Taps
Tap Wrenches
Reamers
Countersinks

New York Office: 101 Reade Street London Office: 13-15 Wilson Street, E. C.



SET No. T=103 CUTS SEVEN NO. 12 IN. \$9.10 NET

WE MAKE
THE FINEST

Screw Plates
Dies
Die Stocks
Nut Wrenches

\$8\frac{25}{NET} BUY ONE No. 103 REECE COMBINATION SCREW PLATE

COMPLETE IN HANDSOME POLISHED HARDWOOD CASE

THE No. 103 REECE COMBINATION SCREW PLATE includes one Reece Adjustable Guide Stock, 24 inches long for $2\frac{7}{32}$ inch diameter DIES; Three individual Full Mounted Stocks; Seven Plate Taps and Seven Reece Adjustable Dies, cutting $\frac{7}{4}$ -20, $\frac{5}{16}$ -18, $\frac{3}{6}$ -16, $\frac{7}{16}$ -14, $\frac{7}{2}$ -12, $\frac{5}{6}$ -11, $\frac{3}{4}$ -10. REMEMBER that this is practically a FULL MOUNTED SET. REMEMBER that the Stocks have MOTTLED FINISH; that the DIES are adjustable, and make perfect threads at one cut; that four persons can use dies from this set at the same time because there are FOUR STOCKS. And LAST, but not LEAST, REMEMBER THE PRICE is only \$8.25 NET, and the Screw Plate guaranteed to give satisfaction or your money will be refunded.

CAN YOU AFFORD TO NEGLECT THIS GREAT OPPORTUNITY?

We request you to place your order with your dealer. If for any reason he cannot fill your order (and he can if he wants to), THEN send to us. DO NOT ACCEPT SUBSTITUTES—INSIST on having the REECE COMBINATION SCREW PLATE No. 103.

We have set forth our arguments in favor of the No. 103 Reece Combination
Screw Plate and now rest our case before the jury made
up of the many thousand readers of The American
Blacksmith, and expect a favorable verdict.

The E.F. Reece Company

GREENFIELD, MASS, U.S.A.

The E. F. Reece Company

Main Office and Factory: GREENFIELD, MASS, U.S.A.

Shall we send you a copy of our new Catalog No. 7, which will soon be ready? вотн-

EVEN AND OVER-SIZE THREADS

cut with each

set of dies

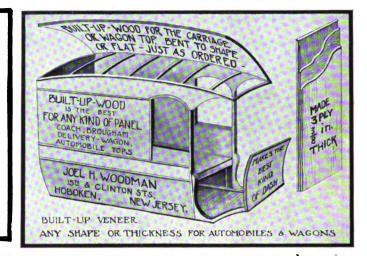
That is one thing with a "Duplex"

that can be done Die Stock. Learn of the further points of difference between it and others.

THE HART MFG. CO.

50 Wood Street

CLEVELAND, O., U. S. A.





GAS PIPE

BIR BLAST

Say! Mr. Blacksmith,

have you heard about the new tire setter called

THE SCIENTIFIC HYDRAULIC?

Blacksmiths are just wild about it where it is used, and the manufacturers are either crazy on dead sure they have a "cinch" on the other fellows for they actually warrant it to be better than any other and will let you be the judge.

GET ONE QUICK IF YOU WANT TO KNOCK OUT YOUR COMPETITORS.

Write for information at once to

The Standard Tire Setter Co...

KEOKUK, IOWA.



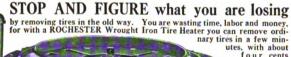
WHAT WILL "KALUX" DO?

It will harden and temper your carbon steel tools—make them last longer and give better service. It stands tests like this. The illustration shows a piece of 5-16" boiler-plate pierced while cold with a chisel hardened and tempered with with the cold with a chisel hardened and tempered with the cold with a chisel hardened and tempered with the cold w This is only one proof of the superior efficiency imparted to carbon steel tools when treated with "KALUX." SAMPLE FREE. TRY IT FOR YOUR-SELF. WRITE and tempered with "KALUX."

METAL HARDENING SOLUTION CO.

Granite Bldg., ROCHESTER, N. Y.

and TORONTO, ONT., CANADA



res in a few minutes, with about four cents worth of gas. A f t e r the wheel is repaired, tire can be put back on in the same way. This heater

h as dozens of other ad-vantages. All explained in our de-scriptive cir-

SENT FREE ON REQUEST. Rochester Tire Heater Co., Rochester, N. Y. Rochester, N. Y., Oct. 26, 1908.

Buffalo Forge Company,

Buffalo, N. Y.

Dear Sirs:-

The No. 200 Blower is doing very good work; the more I use it, the better I like it. It is a very fine heater, and is giving better satisfaction every day.

Respectfully yours,

E. GRIMBLE.

HAY - BUDDEN

SOLID WŔŎŨĠĦŦ

ANVILS

The Gold Medal Anvil

OMAHA, 1898 PAN-AMERICAN, 1901

Every genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with the best Crucible Cast Steel. Every genuine "Hay-Budden" Anvil is made by the latest improved methods.



Over 150,000 in Use WARRANTED

WEIGHTS FROM 10 to 800 LBS.

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality. Form and Finish to any others on the Market.

BROOKLYN, N.Y. HAY-BUDDEN MFG. CO.,

ing. heb.

VOLUME 8

THE

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NUMBER 5

AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO
N.Y. U.S.A.
FEBRUARY, 1909

\$1.00 A YEAR 10c A COPY



Just Say:

"Send your Machinery Catalog and Prices."

A post-card will do. Our loose-leaf machinery catalog will come by return mail.

We do not know how well your shop is already equipped, but we do know that when you need tools—whether it's a Band Saw or Jointer, a Post or Power Drill, a Portable Forge, or a machine for Boring Hubs, or for Tenoning Spokes—we know you can't find more all-around satisfaction anywhere than in the "Silver-quality" tools.

That statement sounds a bit boastful, when you don't know our tools, but it sounds quite modest when you do.

If your visiting salesman tries to convince you that you can get your "money's worth" to better advantage elsewhere, just doubt his word long enough to send for our catalog and prices and find out for yourself. Of course, if the tool you buy isn't what we claim, you get your money back without a quibble.

When you buy a machine it does make a difference what you get for your money.

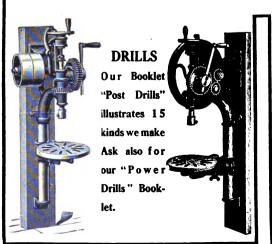
Good quality is, after all, the only basis of machine merit; low prices or appearances don't last very long, if the machine isn't properly constructed and durable. The "quality" kind is the only kind you get in Silver machines.

Be sure to send for our Machinery Catalog with illustrations and full descriptions.

Silver Mfg. Company

365 Broadway

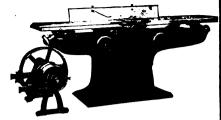
SALEM, OHIO



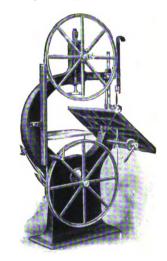
FORGE Our Portable Forge Booklet illustrates some 14 kinds We have a size to suit your needs. Strong and durable. Attractive de-

PORTABLE





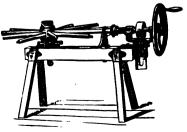
SILVER'S NEW JOINTERS Five Sizes-8, 12, 16, 20 and 24 inch. New "patent applied for" features.



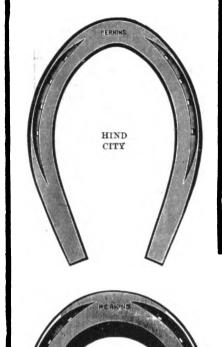
SILVER'S NEW BAND SAWS Four Sizes-Patented tilting device for table-All parts easily reached by operator-New ratchet foot power de-

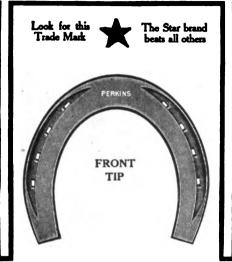
vice on 20 inch machine.





SPOKE TENON MACHINES Seven Sizes, Fitted with Star Hollow Auger. Rigidly constructed.





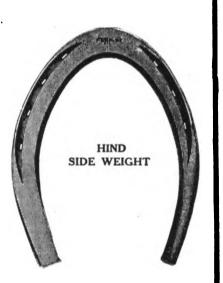




★PERKINS★HORSE SHOES TOE CALKS

TOE CALKS
The SUPERIOR Kind

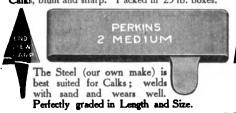
Have more points of superiority than any other make. An upto-date shoe for upto-date Blacksmiths.



Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send COMPLETE CATALOG AND SAMPLE FREE

PERKINS

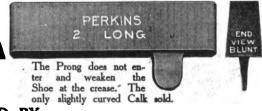
Made in Medium, Long, and Extra Long, both blunt and sharp, also Medium Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.



WRITE TODAY.

TOE CALKS

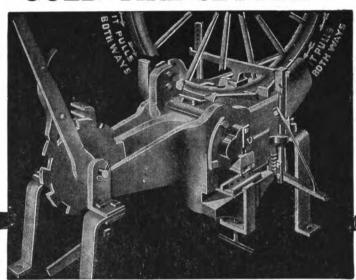
Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY PROVIDENCE, RHODE ISLAND.

Uncle Sam's Choice—THE HOUSE COLD TIRE SETTER



IT is a marvelous success. Hundreds of smiths have already gotten comparatively rich by using them, and thousands of others have made good money with them.

And why not, for a man can take in Fifty Dollars in a day on one. Or one man can set as many tires in a day on one of them as eight men can the old way. If you had the work on hand to do at one time you could take in the price of the machine in three days. Consequently, you see it only costs you the price of three days' time, as it does the work at that rate even if you do not set them all at one time.

And as money was scarce last year and there were but few new wagons bought, so there will be lots of repair work this year. And besides, the seven wet years are past and the seven dry years have come at last, so you see there is a double reason why you should order at once and be ready for the harvest.

Now, is it a fact that you will hesitate to order because you can set them the old way and just hate to get out of the rut?

Our machine sets tires just like the old hot setters, and they are just as simple and as easily worked. They simply grip the tire on the edges and shrink it right on the wheel cold.

And besides, ours is the only cold tire setter that has a shear and punch, and our shear is a "Gem." Altogether, our machines are the best in the world, and the proof is in the fact that we have ten times as many in actual use as there are of any other make.

They are sold cheap and on easy terms. WRITE US TODAY,

HOUSE COLD TIRE SETTER CO.

216-218 S. Third Street, ST. LOUIS, MO. J. F. HOUSE, 201 Church Street, TORONTO, ONT., CANADA

BUFFALO BLACKSMITHS' TOOLS

THE ILLUSTRATIONS REPRESENT TWO OF OUR LATEST INVENTIONS.

Buffalo Multiple Punch, Shear and Rod Cutter.

Is indispensable for the general blacksmith and jobbing shop. Practically four machines in one. Five holes of different size may be punched, round and square rods cut and bars sheared, with absolutely no changes in attachments. This variety of operations in one machine makes it particularly economical in price as well as labor and floor space.



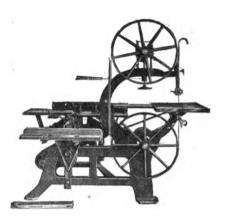
Buffalo Angle and Tee Bender.

A powerful, yet simple device for bending hot Tees and Angles. Any Angle up to and including 90 degrees. Tee is securely clamped in a vise which conforms to the shape of the Tee. The handle is detached when Tee is inserted, then is quickly placed in position again by simply engaging with two lugs. By this device a perfect bend is obtained with no twisting or crumpling. The base is cast iron with forged steel lever. Very compact and durable.

Buffalo Forge Company Buffalo, N.Y.



NOTICE!



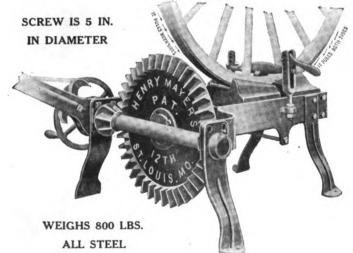
If you wish to reduce the cost in your wagon and repair shops, send for our catalogue "B," giving you a complete description of the famous Universal Wood Worker, also of the Combined Saw Table and Jointer, especially adapted for the wagon maker and blacksmith trade. Can be furnished complete with pole, felly and spoke rounder. It will pay you to get this catalogue without delay, as these machines are the only practical machines on the market today for the blacksmith and wagon maker. We can show you where you can save the price of the machine the first year.

THE SIDNEY TOOL CO.

SIDNEY, OHIO, U. S. A.

Mayers Tire Setter Mfg. Co. Announce! The "Only Cold Tire Setter That Pulls Both Ways"

Will be sold this year on SUCH A BASIS that any blacksmith can buy one. Our making and selling capacity has been so increased we are going to give the trade the benefit of it by



GREATLY REDUCING THE PRICE OF THE MACHINE.

You can get one NOW. Our WARRANTY is STRONGER than ever. We not only warrant the machine to "Stand up to the Work," but we warrant it will PAY FOR ITSELF, and let you

TRY IT FOR ONE YEAR TO PROVE IT.

Write today for full particulars—It's the fairest, squarest proposition you ever saw.

Whether you intend to buy or not, it will be interesting for you to see how just this

be interesting for you to see how just this offer is, both to us and you.

MAYERS TIRE SETTER MANUFACTURING CO.

4028 - 30 Forest Park Boulevard

ST. LOUIS, MO.

Trade Literature and Notes.

A NEW LINE of Nut Splitters and Bolt Clippers are being introduced to our readers by the Carolus Manufacturing Company, Sterling, Id. These tools are made in three sizes and three different styles of cutting blades for each size. The jaws or blades are drop-forged of high-grade steel; they are supported on each side with a 40 carbon spring steel dropped forged plate which gives the jaws a most rigid support so that they cannot twist or spring. Screws are made of steel case hardened and are forced into the plate under heavy pressure so they cannot loosen; the slot in the plate always keeps jaws in proper line; the handles and wings are fmade to stand the work they are intended to do. The manufacturers say that they have yet to hear from a single tool of which the handle became bent or broken. This tool is especially adapted for repair work of all kinds It is guaranteed against parts giving out under normal use in consequence of defective material or workmanship. This line is being sold by jobbers, but our readers can secure circulars and prices by writing direct to the Carolus Manufacturing Company, Sterling, Ill A NEW LINE of Nut Splitters and Bolt Clippers

THE WHITE LILY GASOLINE ENGINE

THE WHITE LILY GASOLINE ENGINE is three horsepower, four cycle, air cooled. The manufacturers wish to bring its merits before the consideration of every one of our readers and give the following reasons why this engine is well adapted to their requirements.

First, they state, it takes little room, requires no house or foundation, and, if necessary, can be carried anywhere by two men, which makes it especially convenient if machines are located out of the shop or in out of-the-way places. It produces full three horsepower, uses a minimum consumption of gasoline and electric current, both of which items are automatically cut down if the load is reduced. The feature of air cooling is an exceedingly important one, as many shops are not adequately heated at any time and not at all at night. Most water-cooled engines in these cases must be given special attention to avoid freezing. The air-cooled engine, on the other hand, requires no more attention in the winter than in the summer and runs equally well at all times. The White Lily Engine is especially simple in this particular, as the cooling fan is attached to the rim of one of the fly wheels. This makes a highly effective as well as a simple machine. The speed of the fly wheel being 550 revolutions per minute, a steady and constant current of air is thrown on the flanges of the cylinder.

The construction of the White Lily Engine is

cylinder.

The construction of the White Lily Engine is such as to command the highest commendation, as the cylinder itself instead of being cast in

its final form is cast smooth and the flanges are cut in a lathe, thus eliminating the defects of ordinary castings. The whole machine is constructed with great care, smoothed and limbered up for 48 hours in graphite, run constantly under its own power iand tested for many hours more before shipping. The engine is fully guaranteed as to horsepower and construction, and is sold with the agreement that if after thirty days' trial the purchaser for any reason whatever does not decide to keep it, he is at liberty to return it at the expense of the manufacturers and receive the full price, so that the experiment has cost him nothing. Our readers are referred to the advertisement of this engine on another page and it would pay them to investigate fully if in need of reliable shop power.

"KALUX" is a new solution for hardening steel that is being introduced to our readers and with which many no doubt are already familiar. It is manufactured by the Metal Hardening Solution Company, Rochester, N. Y. To those who have not already tested the merits of "Kalux" for hardening all kinds of carbon steel tools we wish to make mention of the manufacturers' liberal offer in which all our readers are invited to send for a free sample. A sufficient quantity will be sent to give it a fair trial and at no cost whatever. The success and general favor with which

"Kalux" is being used in many of the largest railroad and other forge shops of the country indicate that it is deing all that is claimed for it. The manufacturers state that this solution will increase the efficiency of Carbon steel from fifty to one hundred per cent, and in some particular cases in which careful tests were made has produced an efficiency gain of as much as three and four hundred per cent. You can get a sample of "Kalux" and try it on your own work by simply sending your name and address to the Metal Hardening Solution Company, Granite Bidg., Rechester, N. Y. The advertisement of this company will be found elsewhere in this issue



BUGGY TOPS, \$4.60 TOP BUGGIES, \$35.00 RUNABOUTS, \$32.00 Cushion Backs, Storm Fronts, Poles & Shafts. Write for 100-page Catalog. **BUOB & SCHEU,** 500-520 Court Street. Cincinnati, Ohio

WE MAKE and Sell

direct to Vehicle Dealers, Blacksmiths and Wheelwrights .

POLES, SHAFTS, WHEELS, SEATS, BODIES, GEARS,



and similar vehicle material. As we are manufacturers, not jobbers, we can sell you the goods at a lower price—in any stage of construction—when you want them. PROMPT SHIPMENTS is a feature with us.

SEND FOR PARRY ACCESSORY CATALOG.

PARRY MFG. COMPANY, Indianapolis, Ind.



Chicago No. 57 Combination Saw and Jointer.

THE FAMOUS

CHICAGO LINE

Wood Working Machinery

ESIGNED especially for blacksmith and wagon shop equipment. We show only a few of our machines here, selected from our big, complete Write for circulars and net price list. scribes in detail all of our machines. Mention The American Blacksmith. WRITE TODAY. Come in and see us when in Chicago. Over 600 machines exhibited.



Chicago 27, 32, 36 in. Band Saws.

CHICAGO MACHINERY EXCHANGE

13 - 15 N. Canal Street, Chicago, Ill.



EXCLUSIVE REPRESENTATIVES

Baxter D. Whitney & Son C. O. & A. D. Porter Hermance Machine Co. McDonough Mfg. Co. Greaves-Klusman Co.



BEFORE and AFTER

= BUYING A



BROOKS Notice the vast difference in the two shops. Before buying a Brooks Cold Tire Setter the old shop had very little business. Everything about the place looked dead-even the tree. The only signs of life were the chickens and they had to scratch for a living. Competitors were getting the tire-setting trade. The 'smith became discouraged. Business was dull—yes, frightfully dull. He wondered why he had such little trade.

THE BROOKS

The machine that did

it.

ARE YOU

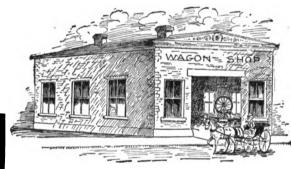
INTERESTED

Write us today for illustrated catalogue and fine pocket memorandum book. The BROOKS makes the smith rich. Free to you. Endorsed and in use by the

Becoming interested he bought a Brooks Cold Tire Setter. Business began to pick up immediately. Soon he controlled the tire-setting trade in his locality. Other new work came to him as well. Made a far larger profit over the old hot process. Tore down the old shack and erected his fine, new shop, shown below. Business is now humming in his place. All because he bought a Brooks Cold

Then he became interested in the Brooks Cold Tire Setter.

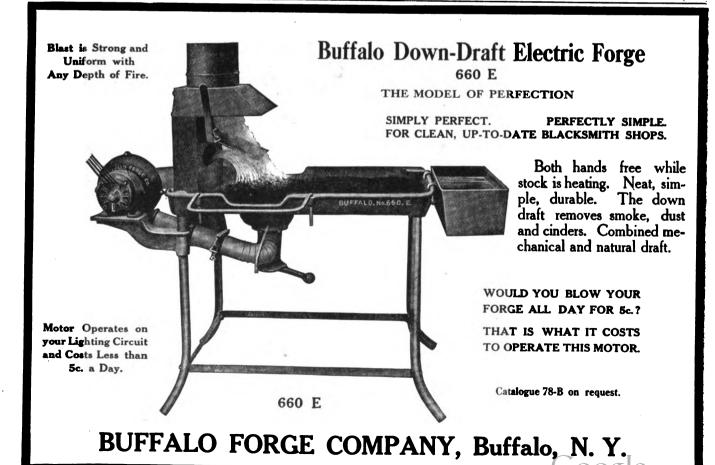
Tire Setter.



The Brooks Tire Machine Co.

396-393 Ellicott Square BUFFALO, N. Y.

121 North Water Street WICHITA, KANSAS





EVERYTHING NEEDED FOR IGNITION The Dayton Electrical Mfg. Co.

152 St. Clair St., DAYTON, оню.

Build Your Own Incubators and Brooders

Save money. Thousands are doing it every year. I teach you how and supply all the parts you cannot make, at low prices. My New Lampless Brooder will cost you \$4.00. Greatest Brooder invention of the age. Repairs and supplies for all kinds of Incubators or Brooders, My new book of plans and catalogue has over 100 illustrations, showing step by step every stage of construction—so simple a 12 year old boy can follow them.—Send 25c coin or U. S. stamps to cover cost. Your money back if you are not satisfied. I allow Your money back if you are not satisfied, I allow the price of the book on your first order. Send for the book today. It means Dollars to you. H. M. SHEER, 515 Hampshire St., Quincy, Ill.

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A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy sea son would pay for itself in full.



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SHINGLE Co.

You should send at once for our 48-page Catalogue IT'S FREE

Tools for the Shoer and Smith

CHAMPION TOOL COMPANY

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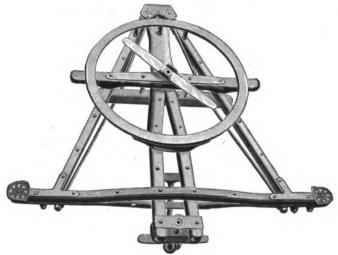
WARNING!

Keep Your Eyes Open. Don't Be Deceived Forever.

Some so-called Gear Manufacturer, with crude and antiquated facilities for manufacturing, has been holding you up for years, charging you much more than the goods are worth.

With our superior and up-to-date machinery we furnish you a better article for less money.

SPECIAL OFFER.



Gear No. 31 M.

For 1 3-8 in. Axle.

1 3-4 x 40-42 Spring.

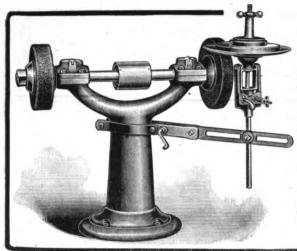
Our present price for this Gear is \$10.00 f. o. b. cars Muncie. The large volume of business we are getting may enable us to reduce it later on. If so we will give you the benefit.

Order through your nearest jobber. If he will not furnish it order direct from us.

Send for our complete catalogue.

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Perfection Disc 1 Sharpener

Emery Stand Attachments

are used throughout the United
States, Canada and Mexico.

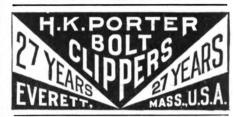
The spring regulates the feed (see cut).
Any bevel (straight, hollow or rounding)
may be secured by adjusting little lever
near body of stand. There is no disclosured by adjusting little lever
near body of stand. There is no disclosured to the enery stone to eut speedily.
The feed-pull of emery stone makes the
disc revolve itself so dise is not heated.
Especially designed for plow dises, harrow discs and weeder dises, and will
sharpen any wabbiling or bent disc or coulter
and do good, rapid work.
Fully guaranteed.
We have many testimonials, but our best
is that we ship on trial direct to you.
Thousands in use. Write today for circuar and price.

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the only practical hoof ex





GARDNER Gasoline Engines

are the simplest, most reliable and cheapest to buy and operate.
Adapted for every purpose; built in all sizes. Agents

all sizes. Agents wanted in un-occupied terri-tories. Write at once for catalogue and prices.

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NATIONAL TIRE BENDING MACHINE

for rolling steel and iron tire for wheels to a circle of any desired diameter. It will bend tire from the lightest to 10" wide by 1" thick. Is heavy and well proportioned. Furnished with tight and loose pulleys, with friction clutch pulley, or direct connected motor, if desired at an additional charge. We also manufacture solid steel loose collar axles and the National self-oiling tubular axles and steel stock and hog troughs.

WRITE FOR CIRCULARS AND PRICES.

NATIONAL TUBULAR AXLE COMPANY,



The Roller Motion Four-Calk Heel Weight Horse Shoe

Prevents stumbling, forging, bruising and cutting the

The Burlington Horse Shoe Co., Mfrs., Burlington, Ia.

quarters.
Quickens the action of the front feet, produces the desired fold of the leg and higher knee action.
Is a great help to all horses with sore and tender feet.
Decreases the strain of the nails on the hoof.
Made of best quality toe calk steel, in sizes 1, 2, 3, 4—three weights to each size.

made of best quanty too calk steer, in sizes 1, 2, 3, 4—three weights to each size.

For sale by Beck & Corbitt Iron Co., 1238-1246 North First St., St. Louis, Mo.; Rob't Donahue Iron & Hdwe, Co., Burlington, Iowa, and other leading jobbers. If yours cannot supply you, write us direct for prices and we will supply

THE REYNOLDS AXLE GAUGE

SIMPLE

ACCURATE

DURABLE



Throw away your old straight edge and use this reliable gauge. No more guesswork. This gauge registers the exact amount of set or gather on indicator plate in plain inch measure. Sold on a positive guarantee to give satisfaction or money back. Special inducements on this gauge to hardware jobbers.

Write for prices and get our complete 394-page net price catalog.

CRAY BROTHERS.

(Dept. A.)

CLEVELAND, OHIO



The best power hammer on the market, works material up to 5 ins. round. Fully guaranteed.

MAYER BROTHERS, Inc., MANKATO, MINN.

U. S., New Zealand Agents,
All Jobbers Alex Storrie, Ltd., Invercargill.



1909 Kerrihard Power Hammer

If you ever owned a POWER HAMMER you can appreciate, this 1909 KERRIHARD POWER HAMMER at \$60.00.

It is not hard to convince a "hammer-wise" man that in this 1909 hammer you get a greater value than in any

other at even a greater price.

And if you are now investigating the power hammer market for the first time, read this advertisement. It will show you that \$60.00 is all you need to pay for a hammer that will fill every requirement you have for a power hammer, for plow sharpening, tire welding and general work such as is brought to a blacksmith shop doing general work. Incidentally save you from \$25 to \$100.

This 1909 Kerrihard hammer is not a sensation. sations cease to be sensations when they become practical

everyday happenings.

The 1909 KERRIHARD POWER HAMMER is not the result of a new discovery that a good hammer can "probably" be made to sell at \$60.00.

The 1909 Kerrihard hammer is development, not a discovery of seven years of power hammer building.

The Kerrihard Power Hammer has always been a lowpriced, high-quality hammer.

Therefore, the 1909 KER-RIHARD will not be found to be weak or wrongly constructed before the season is over, necessitating a change in either design or material.

There will not be any necessity to rebuild the 1909 Kerrihard because of insufficient strength or any other reason. There is no longer any need for experimenting.

Can you trust the theoretical or undemonstrated idea of the greatest power hammer builder?

Your money goes into the hammer. You are the one to be inconvenienced by a broken part because it was not made of the right kind of material.

Good designers must experiment before they arrive at We did that years ago. We began making low-priced hammers when we started. Seven years of experimenting are back of the 1909 KERRIHARD. You won't have to experiment for us.

It's impossible to say what might happen if you used a theoretically right hammer that had not been tried out and shown its worth in the shop.

No one knows what a hammer will do until it is tried You probably know a KERRIHARD owner. There are over 1,000 of them. They are our friends and demonstra-They know more about KERRIHARD POWER HAMMERS than our agents. Ask an owner to tell you

about the KERRIHARD HAMMER. Then you will know. That's better than any maker thinks about his hammer.

In the 1909 KERRIHARD YOU WILL FIND perfections and superiorities of the kind that come only with experience—perfections and superiorities that no "paper" hammer can have, no matter how skilled its maker.

If the makers of other hammers knew all the things which seven years of experience in the building of low-priced hammers has taught us, they would not even then make so good a hammer as the 1909 KERRIHARD at \$60.00.

The cost of making the special jigs and tools alone would prohibit it. If we had to commence at the beginning as they do, this 1909 KERRIHARD would cost

you \$50.00 more.

It is only because our jigs, dies and special tools and machinery and initial expenses were paid for and charged off years ago that we can give so good a hammer at so small a price.

The \$60.00 you pay for the 1909 Kerrihard hammer goes not into special dies and tools but into the material, workmanship and testing it goes into the hammer you get.

It is not enough for us to know that our design is right, that the material is perfect, that the workmanship is the best.

It is not enough for us to know that the 1,000 hammers we have made are right. We must know that the particular hammer that you buy is right, so we test it as though we were making one hammer a year instead of 5 a dayour present capacity.

We test them on the hardest kind of work—we give them actual shop punishment of from 2 to 5 hours on heavy and light forgings—the kind of a test you would give if you were working it

yourself. COMPARE THIS 1909 KER-RIHARD \$60.00 POWER HAM-

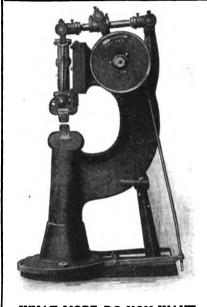
MER with the best hammer made, no matter what their cost or pretentions. You will not find in any of them more good points in design or workmanship. You will not find a proven superiority which this 1909 KERRIHARD at \$60 lacks.

This \$60.00 1909 KERRIHARD is an imposing looking hammer.

Complete specifications and cuts of the working parts will be gladly sent.

Don't buy a hammer until you know all about this wonderful \$60.00 Kerrihard.

This \$60.00 Kerrihard hammer is fully guaranteed. We agree to furnish parts proving defective from any cause within one year after purchase.



WHAT MORE DO YOU WANT THAN YOU GET IN THIS 1909 KERRIHARD HAMMER - \$60.00

THE KERRIHARD

HAMMER AND GRINDER DEPT.

Red Oak, Iowa, U. S. A.

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HOT FORGED DRILLS



By our process of hot forging we produce the strongest and best drills the world has ever nown. If your dealer does not keep "New Process Drills" in stock please write us direct. NEW PROCESS TWIST DRILL COMPANY, Taunton, Mass., U. S. A.

CASE HARDENING MATERIALS

A Carbonizer which is positive, accurate, uniform and speedy is the

"BLAICH MODERN CARBONIZER"

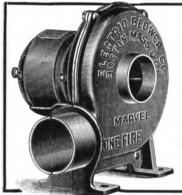
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"MARVEL" ELECTRIC BLOWERS

"ONE FIRE" Marvel, For 4 Light Fires, 55.00 For 4 Medium Heavy Fires, 60.00 For 4 Heavy Fires, -80.00 For 8 Heavy Fires, -

Ask your Dealer, the Electric Light Co., or write to

ELECTRIC BLOWER CO.,

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will reduce inflamed, swollen Joints, Bruises, Soft Bunches. Cure Boils.

Fistula or any unhealthy sore quickly; pleasant to use; does not blister under bandage or remove the hair, and you can work the horse. \$2.00 per bottle at dealers or delivered. Horse Book 7 D free.

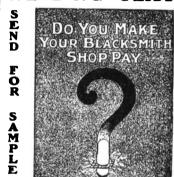
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ABSORBINE, JR., for mankind, \$1.00 per bottle. Reduces Varicose Veins, Varicocele, Hydrocele, Goitre, Wens, Strains, Bruises, stops pain and

W. F. YOUNG, P. D. F., 230 Monmouth St., Springfield, Mass.



THE PHILLIPS-LAFFITTE CO. PHILADELPHIA, PA.

Eccles Ball Bearing Couplings

COUPLINGS ARE SHIPPED **OUT WITH** TWO-PIECE BUSHINGS FASTENED IN THE COUPLINGS

When Bushings are worn out by long use they can be instantly replaced and fastened into the socket by our special process.





Patented Nov. 25, 1902 Patented June 11, 1907

The spring is pivoted at the front so that it can be turned out of the way of the wrench while clipping Coupling to the axle.

NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS

Catalog No. 15 is our Latest

We make a full line of Carriage and Wagon Forgings

RICHARD ECCLES COMPANY, Auburn, N.Y.

THE DAYTON H WHEEL



(PATENTED.)

FOR ALL LIGHT VEHICLES. USED BY LEADING MANUFACTURERS.

Made in High-Grade Malleable Iron.

No. 440B. Buggy Size, 10 in., for 11 or 1 in. Straight Bed Axles.

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IMPORTANT

Axle Tie and Rear Perch Irons will be furnished for PLAIN AXLES unless SWAGED AXLES are specified when ordering.

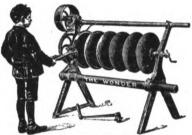
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Beck & Corbett Iron Co., St. Louis, Mo.
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Campbell Iron Co., St. Louis, Mo.
Dayton Iron Store Co., Dayton, Ohio.
Des Moines Iron Co., Des Moines, Iowa.
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Fischer Iron & Steel Co., Quincy, Ill.
Fort Wayne Iron Store Co., Fort Wayne, Ind.
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S. T. & G. A. Gebhart, Dayton, Ohio.
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Hamilton, Bacon & Hamilton Co., Bristol, Tenn.
Haysler Iron Co., Kansas City, Mo.
W. J. Holliday & Co., Indianapolis, Ind.
Huey & Philp Hardware Co., Dallas, Texas,
Jackson Hardware & Implement Co., Durango, Col.
Jones Hardware Co., Richmond, Ind.
Kelley, Mans & Co., Chicago, Ill,
G. A. Kempel & Co., Akron, Ohio,
Minneapolis Iron Store Co., Minneapolis, Minn.
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The Wonder Sharpeners Disc

are in use in 36 states, CANADA and MEXICO. For sale by leading jobbers throughout the United States and Canada.



THE LITTLE WONDER.

The LITTLE WONDER will sharpen any size disc up to 22 inches in diameter. The accompanying cut shows the LITTLE WONDER at work on a whole section of discs. This machine is especially adapted for sharpening Disc Harrows.

The GIANT WONDER is a larger and heaver machine; has holder attachments for rolling coulters and disc plows; will take in discs up to 32 inches in di-ameter; is a geared machine and will also take in disc harrow sections same as the Little Wonder and do the work equally as well. The only machine on the market with these advantages.

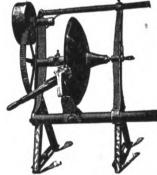
Can shear any part of edge to any bevel.

Can shear back from edge as far as required.

Can use tool on either side of disc. Can shift from one disc to another. Can do all this without the turn of a set screw or

nut; is a positive feed; automatically adjusts itself to wobbling or bent discs; knives made of best grade, selftempering steel, will last a lifetime for hand and power.
FULLY WARRANTED. We pay the freight

both ways if not as represented.



THE GIANT WONDER.

Write to us direct if your dealer cannot supply you giving us his name and address. for circulars.

A. E. DURNER, Mfgr. and LONDON, ONTARIO, CANADA.

EVANSVILLE, WISCONSIN, U.S. A.,

Head Office: Evansville, Wis.

SCOTT'S CRUCIBLE TOOL STEELS

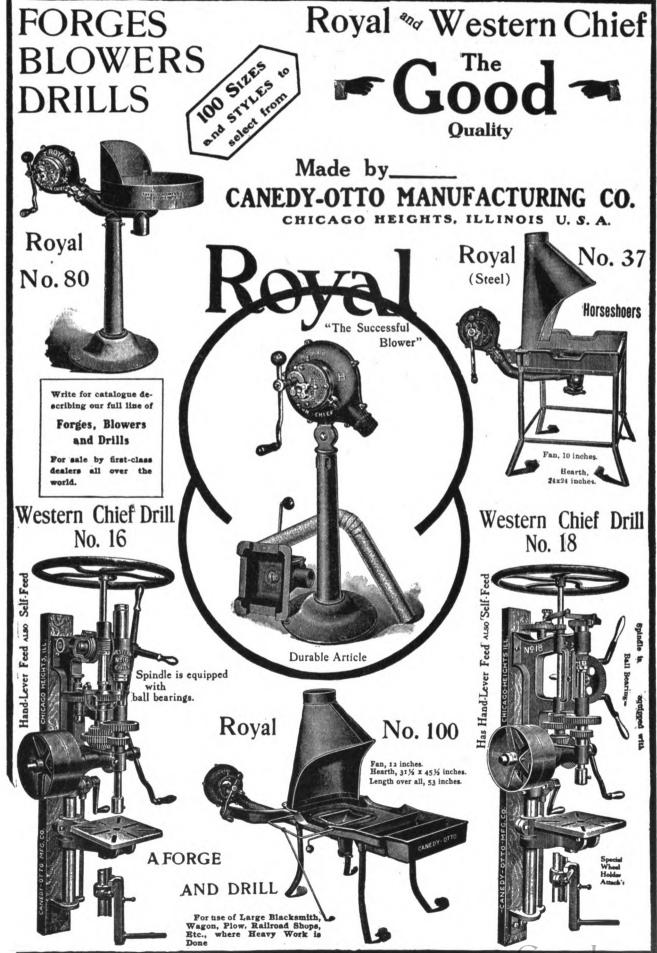
Made in all grades Fully guaranteed All sizes in stock

THE BOURNE-FULLER CO. IRON STEEL PIG IRON COKE

Cleveland, Ohio.



THE AMERICAN BLACKSMITH



ALLEN WINTER

Winner of \$50,000 Handicap, Readville, AUGUST 25, 1908

SHOD WITH THE

CELEBRATED "CAPEWELL" NAIL

THE CAPEWELL HORSE NAIL CO., Hartford, Conn.

Nov. 30, 1908.

Dear Sirs:-

It may interest you to know that I shod Allen Winter for all his races and speed tests during the season of 1908, including the famous \$50,000 handicap race trotted at Readville, Mass., August 25th.

This particular race is said to be the greatest race in trotting turf history. A loose shoe in that race would have caused the owner of Allen Winter to lose instead of win \$30,000.

Notwithstanding the tremendous strain which comes on nails holding the shoes of a race horse, and that Allen Winter is a heavy horse (shod in front with 8-oz. bar shoes with heel and toe grabs, and behind with 5-oz. swedge shoes) I have always found that he can be safely shod with your No. 4 and 4 1-2 nails.

Your nails have always given me perfect satisfaction and I am certain that I have never seen a horse nail which has so many fine qualities as the "Capewell."

Yours truly,

(Signed) F. J. GOODWIN.

"Capewell" Nails Hold Horseshoes Under the most trying strains in all kinds of service.

MADE BY

THE CAPEWELL HORSE NAIL CO. HARTFORD, CONN.

BRANCHES.

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The Largest Manufacturers of Horseshoe Nails in the World.

THE COMMERCIAL **Bar Cutting Machine**

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guarante work.

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Practically Indestructible because made entirely of steel

Will cut 3-8 x 3 Bar Iron or Steel and Punch 1-2 Inch hole in 3-8

A Powerful Machine

Cutting and Punching Bar Iron and Steel, Small Angles, Channels,

eto. Full information furnished upon request.

Manufactured by

THE COMMERCIAL MANUF'G CLEVELAND, OHIO



Try Borax-ette for Welding Toe-Calks THEY WON'T KNOCK OFF

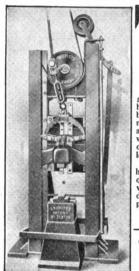
It makes steel weld like iron. It has no equal for welding tires, axles and springs

FOR SALE BY ALL DEALERS

SAMPLES FREE

CORTLAND WELDING

COMPOUND CO., Cortland, N. Y.



107 Fremont Street.

GRIFFITTS BELT POWER HAMMER

MADE OF STEEL Every Part Riveted

It is the strongest and most durable hammer made. The best all-around hammer for blacksmith and wagon shops. It will not get out of order; will not work loose

loose.
This machine will help you do better, quicker and cheaper work. Get our full description and

WRITE TODAY

GRIFFITTS MACHINE WORKS.

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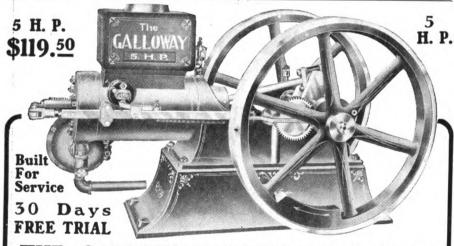


WANTED:

Men to Fill **Good Positions**

Men are wanted to fill the higher positions in the industrial world, such as foremen, superintendents, managers, etc. The call is not for the man who can earn \$2 a day at hard manual labor, but for the man whose technical training qualifies him to hold positions of responsi-bility. Such training can be given you in your own home in your spare time. You are not obliged to leave your present position or to lose a day's pay.

The International Correspondence Schools-that great institution that has done and is doing so much for working men and women-offer you working men and women—one you an easy way to help yourself to a most desirable position in the trade or profession that best suits your taste and ambition. This plan has been tested by 17 years of experience, during which hundreds of thousands of men have been bettered and millions of increased salaries have been brought to those that have adopted it. If you wish to find out the easiest and surest way in the world to and surest way in the world to advance your position and double your salary, mark and mail this coupon now. This puts you under no obligation. It is simply a request for expert advice that is free. Send



GALLOWAY GASOLINE ENGINE

Owned and Made Exclusively by the William Galloway Co., Waterloo, Iowa

Owned and Made Exclusively by the William Galloway Co., Waterloo, Iowa will run your, shop at several times its present capacity and enable you to take lots of jobs that you have to turn down now because you have not the capacity.

Only four things to do: Turn on the switch, turn on the oil, turn on the gasoline, give the fly wheel a start, and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs.

The Galloway has been classed as a standard, high-grade engine for 15 years. Over 2,500 in use in Iowa alone. Thousands in every other State and Territory.

If you try the Galloway engine, you will find that it is not overspeeded. Remember the bore and stroke counts and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake tests.

On the larger sizes, if it is not entirely convenient for you to pay all cash, I will take your note for the balance at the regular rate of interest for 6 months.

The price given is for the 5-horse power only, but we make these engines in seven sizes. Note my special proposition to blacksmiths.

I have a plan by which every blacksmith, an partly or entirely pay for his own machine. It's good; it's away out of the ordinary; and you will be overlooking a big chance if you don't write for my proposition.

Ask for my free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure.

WILLIAM GALLOWAY, President.

THE WILLIAM GALLOWAY, President.

THE WILLIAM GALLOWAY COMPANY, 577 Jefferson St., Waterloo, Iowa.

International Correspondence Schools Box 1302, Scranton, Pa.

Please explain, without further obligation on my part, how I can qualify for a larger salary and advancement to the position before which I have marked X.

Foreman Moider
Foreman Blacksmith
Foreman Machinist
Foreman Toolmaker
Foreman Toolmaker
Foreman Patternmaker
Mechanical Engineer
Machine Designer
Mechanical Draftsman
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"DEFIANCE"

WOOD-WORKING MACHINERY



DESIGNED ESPECIALLY FOR

Wagon and Carriage Builders

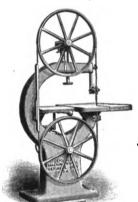
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THE DEFIANCE MACHINE WORKS

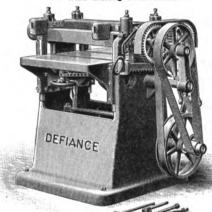
DEFIANCE, OHIO



12-Inch Hand Feed Planer with Boring Attachment



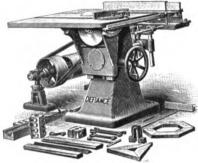
28-Inch Band Saw



24-Inch Single Surface Planer

12-Inch Hand Feed Plan

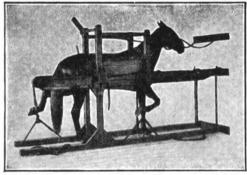
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No. 8 Variety Saw-Rip and Cut-Off

HEMPHILL'S NEW SHOEING STOCKS

Strong and Durable Will Last a Life-Time



The Most Horse in 20

With these stocks the most vicious horse can be shod in twenty minntes without any risk to man or beast. When not in use stocks fold
against the wall and occupy practically no room. Our shoulder rope secures the horse instantly so that he can't get away. The horse cannot
lie down, rear or pull back with our fastenings. The feet are held firm
and taut by a flexible mechanism; no dangerous vise-like foot hold; impossible to injure or break a horse's leg. Two feet can be shod at the
same time. Quick and easy to operate, easy on the horse and no strain
on the shoer. In releasing horse you simply pull a lever and the sling
drops from under him. These stocks have been tried and tested for
years, and are used by the United States army. Write for descriptive
circular, price list and testimonials. Terms and prices liberal. You
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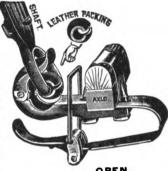
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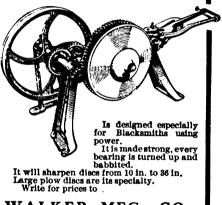
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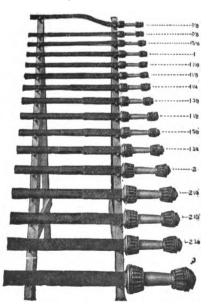
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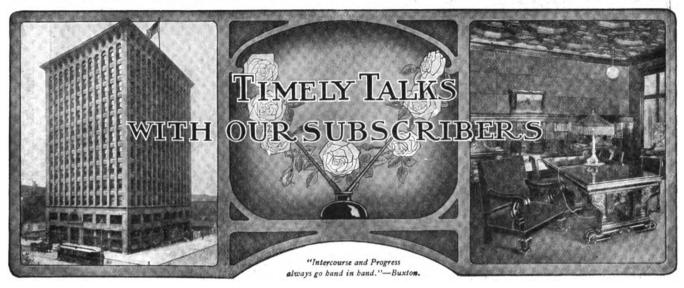
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This link in our chain of satisfactory service to subscribers was forged over a year ago and since its establishment we have placed quite a number of smiths in better localities. But there are always more calls for locations than there are locations, and we desire again to remind you of this department of our service. If you know of any locality without a good smith, if you know of a neighborhood where another smith could locate without interfering with those craftsmen already established, let us know about it. There are lots and lots of smiths in poor locations who could, with profit to every one concerned, take a shop somewhere else. Perhaps you can advise us of some good chances right now.

For Foreign Friends.

Several requests have recently been received from our foreign readers for an explanation of the value of English currency in American coin. We, therefore, address this talk to our foreign friends in the hope that it will assist them in purchasing goods quoted in American money.

The penny in English money is worth two cents in American coin, the shilling in English currency is worth twenty-four and one third cents, while the pound sterling is worth four dollars and eighty-six and two thirds cents. Therefore, if an article is quoted at one dollar (\$1.00) in American money it is equivalent to about four shillings, two pence; while five dollars (\$5.00) amounts to about one pound, eight pence. This explanation, we trust, will enable our foreign readers to understand the prices quoted in our pages. If, however, any of our readers are still puzzled in changing American quotations to English currency we invite them to ask questions on the subject. Any other questions on the purchase of goods from American firms will also be cheerfully answered for our foreign friends.

Contents, February, 1909.

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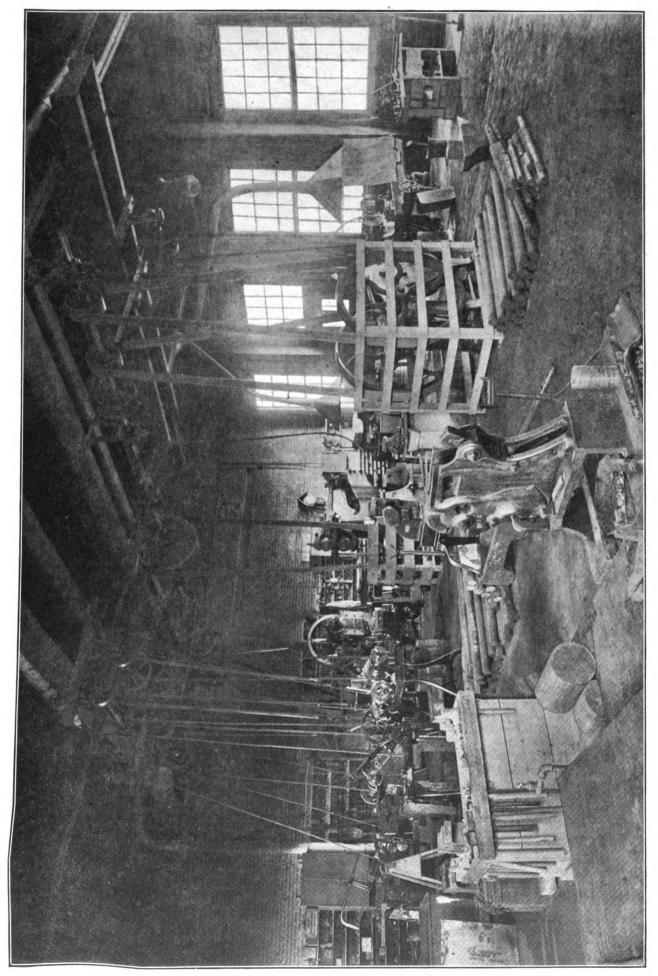
To make each number of "Our Journal" of increasing interest we must have the assistance of "Our Folks." We cannot give you the articles you want unless you ask for them, and then, too, when you come across something of interest in the blacksmith line let us know about it. Send in an item, large or small, whenever you can. We would sooner get a short article on a piece of scratch paper from a practical, up-to-date smith than a whole bookful of typewritten stuff from a professional writer. We want sound, practical articles that have smithshop originality about them, and you, Mr. Reader are the sound, practical man to write them. Don't think that you can send us too much material.

A Christmas Letter.

We know you will be interested in this letter received from an Illinois reader just before Christmas. There were, of course, other Christmas letters received, but we pick out this particular one because it is not only intended for the publishers of "Our Journal" but for "fellow craftsmen" as well. This Illinois craftsman writes: "As Christmastide draws near I am made to realize that the New Year will soon be with us. I look back over the many happy evenings I have spent by a cheerful home fire or in shady yard of summer hours, reading and pondering over the many interesting lines of my fellow craftsmen, and I find it impossible to do without THE AMERICAN BLACKSMITH as I go along life's toilsome road."

If you have a neighbor smith who is not a regular reader of "Our Journal," let him read this letter from our Illinois reader. It will help you to convince him of the real helpfulness of "The paper that fits in wherever there's a forge."

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THE ROCHESTER WORKS OF THE AMERICAN WOOD-WORKING MACHINERY COMPANY IS SAID TO BE THE LARGEST OF ITS KIND AND TO COVER TEN ACRES. THE BLACKSMITH SHOP

An Unusual Welding Job and Some Unusual Forgings

ETHAN VIALL

METHOD of welding the transom bars and end plates used on their motor trucks has recently been perfected by the Curtis Motor Truck Company, of Decatur, Ill. These transom bars are subject to such severe twisting, bending and pulling strains, in actual service, that a mere riveting of the end of the bar into the end plate would not suffice. They must be welded together so firmly as to be one solid piece with practically the full strength of the steel. Several sizes of transom bars and end plates are made by the Curtis people, but the transom bar shown was made of 6 by 13-inch open hearth steel, and the end plate was made of the same material one inch thick. The welding was done on an Ajax forging machine, no flux of any kind being used. Several welded bars were tested at the University of Illinois and showed the strength of the weld to be but very little below that of the rated strength of the steel used.

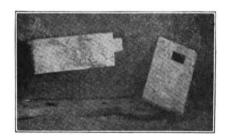


FIG. 1. READY FOR THE FURNACE

A transom bar and end plate tongued and mortised, ready to be placed in the furnace and welded are shown in Fig. 1. The tongue that goes into the mortise is one and a half by two by two, and during the welding operation the end plate is rammed onto the bar so that a 3-inch fillet is formed on each side of the bar where it comes in contact with the plate. The one inch of excess metal on the end of tongue and which projects through the mortise is forced back giving the welding pressure to the sides of the mortise and but little riveting action takes place. Fig. 2 shows how the job looks on the outside of the plate, only a slight outline of the tongue really being discernible. Parts of the outline

were marked in white to make it more distinct in the engraving.

Just to show the enormous strength of this weld I will give the figures of the shearing test as applied at the University of Illinois. The piece shown in Fig. 3 was the one tested for shearing strength and a block of 2½-inch cast iron was placed at A on the transom bar and the end plate rested on a block similar to B. A pressure of 295,000 pounds



FIG. 2. THE OUTLINE IS HARDLY DISCERNIBLE

was then applied to block A, which crushed down at this figure, without the bar or plate showing other effect than a slight compression at top of bar

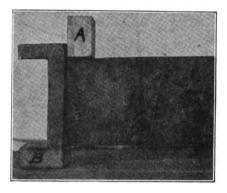


FIG. 3. TO SHOW THE STRENGTH

where block A rested. This test was considered sufficient and so the piece was not sheared off as originally intended. The strength of the solid metal is figured thus: As one and a half by six equals nine square inches (the area of cross section of bar) the number of pounds per square inch, which is 40,000, multiplied by nine equals 360,000 pounds. The area of the cross section of the tongue is one and a half by two which equals three, and multiplying this by 40,000 equals 120,000 pounds. which taken from 295,000 leaves at least 175,000 as the strength of the butt weld: However, there was little doubt in the minds of the experimenters that the piece would stand the full

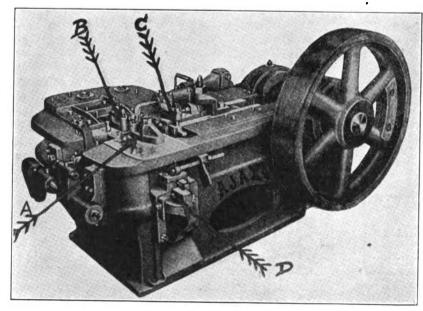


FIG. 4. THE TYPE OF MACHINE WHICH DOES THE WORK Digitized by

load. The pulling tests gave equally as satisfactory results, but they are omitted as not being of interest to most readers.

The type of machine on which the welding is done is shown in Fig. 4, which together with Fig. 5 will give the reader a clear idea of how the work is done, the letters in both engravings corresponding. The jaw or ram, C, carries the die that acts as the welding hammer and it moves in the direction indicated by the arrow, Fig. 5. The stationary die jaw is at A, while B is movable in the direction indicated by the arrow. In operation the transom bar is placed against the die jaw A, the operating pedal is pressed and the jaw B moves up, clamping the bar firmly in place, the ram die striking the

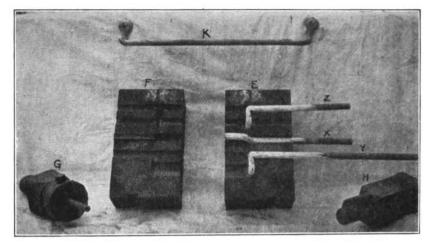
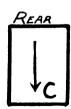


FIG. 7. FREIGHT CAR HAND-HOLDS ARE QUICKLY MADE IN DIES

naces operated by crude oil and compressed air are shown at the left.

FIG. 6. THE HEATING AND WELDING OPERATIONS GO ON CONTINUOUSLY

end of bar an instant later. A finished weld being removed from the machine is shown in Fig. 6. The heating fur-



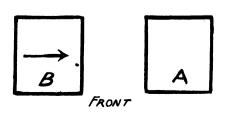
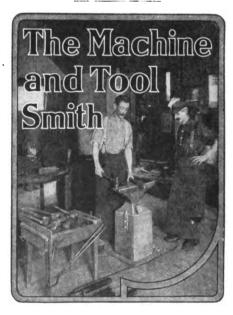


FIG. 5 DIAGRAM OF POSITIONS OF DIE HEADS

Freight car hand-holds are made at the Wabash Railroad shops in a forging machine of the same type as the one shown in Fig. 6. The die E, Fig. 7, is placed in jaw A, Fig. 5; die F is placed in jaw B and the two punches G and H. Fig. 7, are placed in jaw C, Fig. 5. Several strokes of the machine are required to finish this piece. The rod is heated and the first stroke of the die in jaw B, Fig. 5, leaves it fast as at X. In the next stroke the punch H, set in jaw C, upsets the end and leaves it as at Y. In the third stroke the punch G punches the bolt hole as at Z. The final bend, as in Fig. 8, is done by the dies shown, which are bolted to the jaws at D, Fig. 4. These jaws are generally used as cut-offs only, but in the case just cited they are used to do bending. The finished hand-hold K is shown at the top of Fig. 7.

Still another forging and bending job is shown in Fig. 9, the finished forging being shown to the right of the top of the engraving. The letters of the dies correspond to the letters on the jaws of the machine in Fig. 4. The punch which goes in jaw C and does the bending of the end of the hook is not shown, but a little inspection will show how it works.

A method of bending thin plates into long U-shaped bends on a bulldozer is also in use in the Curtis shop, which I believe is not generally practiced, and the chief feature of which is the placing of rollers at the edges of the female die, which does away with the tendency to distort or stretch the thin, hot metal as the punch forces it in. Fig. 10 shows a bend about half completed, a pile of finished pieces being shown in the background. The machine used is a common type of bulldozer.



When tempering a hammer you will notice that the outside or edge of the hammer's face is usually very hard while the center is soft. This causes the edge to chip off. To overcome this tendency pour a small stream of water in the center of

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the face of the hammer and you will find the entire face to be of uniform and even temper. J. R. H., Pennsylvania.

When small fine steel points are to be tempered, say an awl or a fine leather punch such as shoemakers and harness-makers use, the average smith is all "at sea." A simple method of doing the job is to heat the tool to a low red and then stick it into a piece of common laundry soap to cool. This will give you the desired temper.

R. D. Lee, Ohio.

About Compressed Air.

UNCLE AIR.

The December issue contained an article on forging and hardening high-speed steel by F. F. Hoeffle, who is correct in his methods and has the same ideas as myself.

I would like to inquire about the compressed air he used for I have had experience with compressed air myself. I would like to know how he is going to get dry compressed air, made by an air compressor, on a rainy or foggy day when the inlet air pipe is outside in the open air. I have tried air made on such days and it is damp, and when

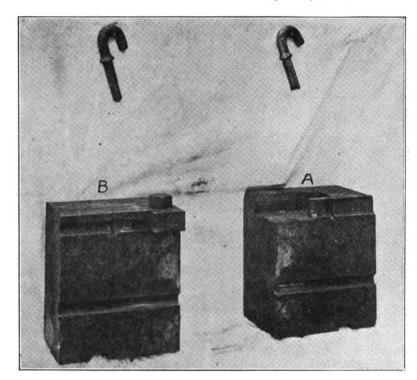


FIG. 9. THESE DIES MAKE THE HOOKS SHOWN ABOVE

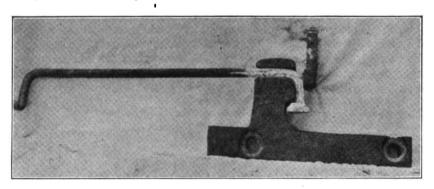


FIG. 8. THE HAND-HOLDS ARE ALSO BENT IN DIES

used in the forge the fire is dead and when used as a quencher on high speed steel it causes cracks. The only way that I know of getting dry compressed air is to have the inlet pipe in a dry atmosphere, and the safest way is to heat it before it is used in the black-smith shop.

I have used a compressed air that has to my knowledge never been used by a blacksmith outside of Norwich. and I believe that not another blacksmith in this country has ever used it on a high speed tool but myself. I wish to describe this air. It is made by allowing water to fall in a cone made of boiler plate, placed two hundred twenty feet below the Quinalang River. This air is both cold and damp and when used in a blacksmith shop gives poor satisfaction. The air is damp at all times and it takes a furnace to heat it before it gives satisfaction. I tried the air on a lathe tool and when I

dropped the tool on a board floor it broke in several places. I tried for mere curiosity, one day, to let a blast of this air into my tuyere iron without building any fire, and in one half hour I could scrape one quarter inch of frost off the top of the tuyere iron. However, I wish to say that this air can be used to some extent in a horseshoeing fire. I will describe how it is used. The fire is built about a foot deep and a 1-inch gas pipe from the compressed air main will give more than sufficient blast to run such a fire.

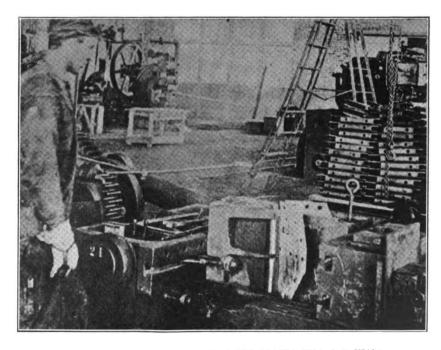


FIG. 10. THE BULLDOZER BENDS THE PLATES, INTO A U-SHAPE

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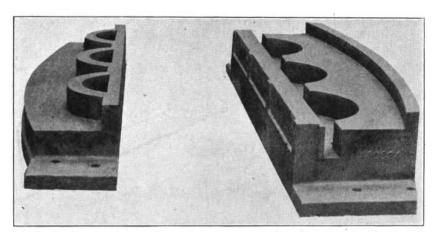


FIG. 1. FOR FORMING TANK SUPPORTS ON THE NEW STEEL CARS

I do not want to criticise Mr. Hoeffle's article, but I hope that he will agree with me on the compressed air, because he didn't say how to get dry air, although he said to use dry compressed air. I wish to say through THE AMERICAN BLACKSMITH that the fan blast is good enough for me for cooling off high speed lathe and planer tools, and I have used fish oil and got satisfaction out of it where I didn't have an air blast on all-around work. I have also found out by experience that Mr. Compressed Air is an enemy of mine and that I can't trust him, so I am now a great friend of his wife. Mrs. Fan Air, and I am going to have her sue old Compressed Air for a divorce. Then I will take her for my wife and I believe that I will have a good, true, faithful friend the rest of my life.

Tools and Formers for Bulldozers and Steam Hammers.

G. M. STEWARD.

To keep abreast of the times the machine smith must be persistent in his efforts to gradually get away from the anvil, and the events of the year just past have served to strengthen our convictions as to the advantages to be derived from the practice of die forging and pressing. This idea is not a new one. Closely following the invention of the steam hammer came the conception of dies or formers, crude at the beginning, for the making of different articles, and thus the first move was made leading to the completing of forgings elsewhere than on the anvil. This branch of our work has made rapid strides and the full measure of its development has not yet been reached. The bulldozer and the forging machines have within the last few years invaded fields previously untouched by the steam hammer and drop hammer.

As we advance from anvil work to

die forging and pressing we are not detracting from the trade of the blacksmith, rather do we believe that when improved facilities are brought to bear, as applied to the making of forgings, we are assisting in the advancement of the trade. The skill possessed by the competent smith may not be necessary for the operation of die forging, but is nevertheless a desirable qualification. as in this line of work, particularly drop forging, all the processes and operations used by the smith are embodied. Mate-. rial is swaged, fullered, drawn, upset, punched, drifted, welded and cut off as it is on the anvil. The most essential

shop to have a master workman whose duty it would be to assist in the making and repairing of dies and formers. This man may be machinist, draughtsman or blacksmith, and should not be expected to be the embodiment of all knowledge pertaining to this line of work, but should be the possessor of a reasonable amount of originality and ingenuity.

As sketches and figures convey a better understanding of the ideas we wish to impart, would offer for your consideration the following: We have received a communication from Mr. C. G. Junean, foreman of the C. M. & St. P. R. W. Co.'s smith shop, describing some special tools used on the Williams & White bulldozer, also on punching and shearing machines. Mr. Junean is now using on his bulldozer a tool on which swing hangers are bent and welded, the increase on output being about one to four on this job. These hangers are made from material three fourths by one and a half inches, bending on edge; tool for first bend is made to run in a groove to guide rollers. using two arms working on hinges. Iron is heated about six inches in center. the arms taking the iron on end, working from outside edge of former, moving forward toward center at an angle of

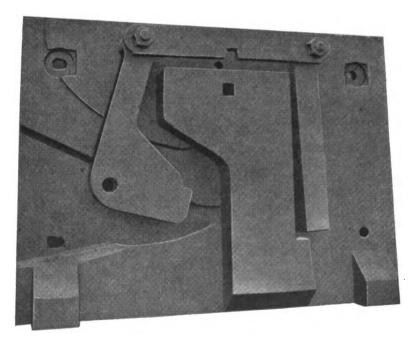


FIG. 2. BRAKE BEAM SAFETY HANGERS ARE BENT INTO SHAPE

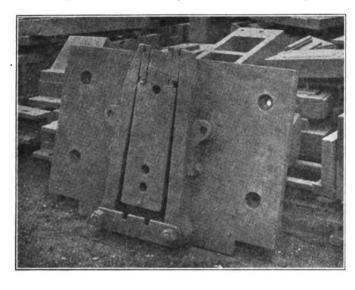
point in this connection, in addition to quickening of processes and increased output, is the uniformity of the product, the uncertainties of hand work being practically eliminated by the use of dies. We are of the opinion that it would be to the interest of any large about forty-five degrees until bend is complete, then moving straight center to meet former, squaring job and finishing first bend. The second bend is made on tools of quite a different type, but one arm can be used on live head as it is necessary to clear end of hanger

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in making lap for welding, and instead of using groove in plate, a wall and spring are used, forcing arm against wall, guiding same around a very short curve, two and five eighths inches inside measurement, and looping ends five inches long on each side of hanger. The This tool can be used for different shapes of bends, having a side and end motion which is handier than any tool now in use in Mr. Junean's shop.

Fig. 1 shows a die designed for the forming of tank supports for the new steel dining cars. These supports are

the yokes are heated in the center, placed in this die and one revolution of the machine forms a yoke and punches the center hole. In Fig. 4 is shown a wing die for completing brake hanger bearings for freight car trucks. These are made from one and an eighth by



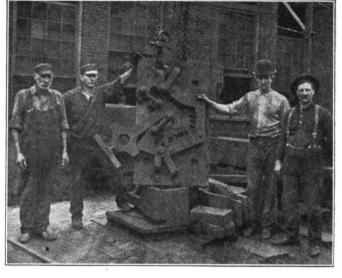


FIG. 3. FOR BENDING WESTINGHOUSE FRICTION DRAFT GEAR YOKES

FIG. 4. FOR COMPLETING BRAKE HANGER BEARINGS
FOR FREIGHT TRUCKS

hanger is now ready for welding, after making second bend, and is sent over a chute right into a furnace to be heated for welding, thereby saving heat and making welding heat easier to obtain. The output of these hangers is about forty per hour.

Mr. Junean also has in service a tool for bending eye bolts from three eighths inch upwards, records there being of the best, bending \(\frac{3}{2}\)-inch eye bolts at the rate of five hundred per hour; these are doubled, forming a hinge, such as are being used on stock car hay racks.

made from sheet steel thirteen sixteenths by fourteen and three fourths inches by four feet nine inches. This die can be adjusted to either bulldozer, hydraulic press or steam hammer. In Fig. 2 is shown a die for bending brake beam safety hangers for four-wheel passenger car trucks.

Fig. 3 shows a wing die for the bending of Westinghouse friction draft gear yokes; these yokes are made from one and a fourth by five-inch material, cut six feet six inches. Both ends are first upset in a forging machine, after which

three and three-fourths inch material, cut forty-two and a half inches long, being first bent to shape, excepting the turning of the eyes. They are then taken to a punching machine where all holes are punched, then reheated and placed in this die, which straightens them and turns the eyes complete in one operation.

Fig. 5 will convey a faint idea of the dies we have been required to make for the purpose of building the new steel passenger cars, giving as well a full view of the entire die platform and showing the overhead trolley which we have erected for the handling of the heaviest dies, some of which range in weight as high as three tons. These are used on our No. 12 bulldozer, the heaviest of the lot being used for the pressing of upper deck roof ends for steel passenger cars.

Space does not permit the showing of blue prints of all of our dies, which number more than two thousand, but a few will be shown in a succeeding issue. These are of a character which would be most beneficial to smaller shops.

(To be continued.)

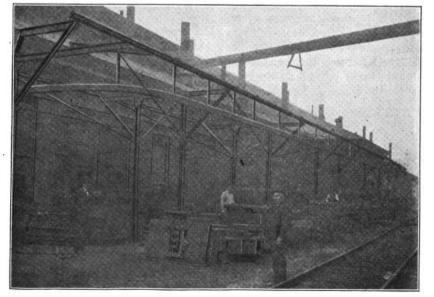


FIG. 5. DIE PLATFORM AND THE OVERHEAD TROLLEY FOR HANDLING HRAVY DIES

Calculating the Weight of Stock. NELS PETERSON.

In shops where a general blacksmith business is carried on it often happens that bids on large jobs have to be submitted. In order to be able to figure close where the competition is keen it

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might be of benefit to know how to figure the weight of iron to get at the cost of material that enters into construction. The most common shapes of iron used on ordinary classes of work are flat, round and square. To find weight of a piece of iron of any given size or shape one must first find the number of cubic inches it contains.

Take, for instance, a piece of round stock 1½ inches in diameter, 12 inches long, to find the number of cubic inches; the rule is to square the diameter and multiply by .7854. This gives us the area of the cross section. Then multiply by the length of the piece in inches.

Example: 1½ inches reduced to a decimal is 1.5, and 1.5 squared equals 2.25; 2.25 multiplied by .7854 equals 1.78, which is the area in square inches of the cross section; 1.78 inches multiplied by 12 inches equals 21.36 cubic inches in a piece of 1½-inch round iron, 12 inches long. A cubic inch of wrought iron weighs .28 pounds. Then 21.36 multiplied by .28 equals 5.9808, or 5.98 pounds.

(To be continued.)



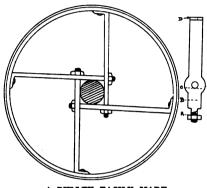
A Shop-Made Line Shaft Pulley.

I recently installed a gas engine in the shop and the accompanying engraving shows the style of pulley I made for the line shaft. The engraving is self explanatory and the construction of the wheel may be seen at a glance. In making the spokes of the wheel allow for drawing the nuts up considerably so that the wheel can be fastened absolutely tight upon the shaft. In figuring the stock for spokes, measure from B to D for the diameter of the pulley less the thickness of the stock used for the face of the wheel. From A to C is the diameter of the shaft upon which the wheel is to be fastened.

In measuring this place the nut about midway on the thread of the spoke. For a wide-faced pulley a preliminary band of about two inch band iron should be used first and fastened and then the wider band shrunk on.

For Holding Slip Shares. c. w. METCALF.

This is a simple little device that will hold a slip share with ease. Take a piece of $\frac{3}{4}$ -inch square soft steel twenty-

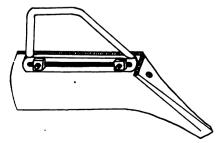


A PULLEY EASILY MADE

four inches long, bend it in the center and weld the ends together, leaving a space of about half an inch between the two parallel pieces. Now take a piece of a-inch round stock twenty-four inches long and weld each end of this piece to the piece first made, and shape it, as shown in the engraving. The device is now ready for use. It bolts to the bottom side of the share and will hold it firmly for manipulation under the power hammer.

A Device for Holding Slip Shares. ALBERT SCHUETZ.

First make two pairs of special tongs as shown in engraving, having upper jaws forming a T. The long handles of these tongs should measure twelve inches from rivet hole to handle end, while the short handles are fitted with notches as shown. After riveting the tongs together bend the handles up or toward the T-jaw at an angle of about thirty degrees. Now secure a



A DEVICE TO HOLD A SLIP SHARE

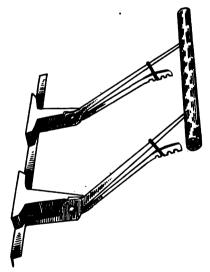
piece of angle steel one by one by onefourth inch and sixteen inches long, and rivet the tongs to this eight inches apart and in such manner as to make the angle piece the lower jaw of the tongs. Now finish device by fastening a wooden crossbar sixteen inches long to the long handles of the tongs.

In using the device, slip the share between the jaws of the tongs so that the angle piece is on the bottom side of the share. Now slip the links over the tong handles so as to hold the share firmly. The operator at the power hammer by placing the share on the anvil and resting crossbar against his leg has perfect control of the share and can do a nice job of sharpening and the share will stay perfectly in line.

Shackles, and Tools for Making Them.

W. HUDSPETH, Australia.

To make a number of shackles on the anvil without the use of any special tools means a vast amount of work, and even when made by good craftsmen are very seldom all alike. The accompanying illustrations show a handy set of tools for making shackles of any size up to about $\frac{3}{4}$ -inch iron.



FOR CONTROLLING A SHARE UNDER THE POWER HAMMER

Suppose, for instance, that a number of ½-inch shackles are wanted. On starting the job a number of pieces of iron are cut off the required length to make the shackles. A short heat is taken on the end of each piece, and bent over at about three fourths of an inch from the end. The piece is now heated to a welding heat and placed between the tools A and B and kept revolving till the end has formed a complete ball.

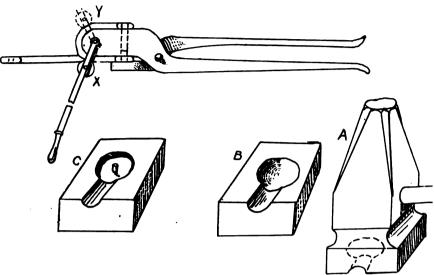
These tools are made in a similar manner to a 1-inch swage, except that the groove runs only partly through and the centers of the tools are depressed to almost a half sphere, the

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two of which when placed together form the shape of the ball wanted.

After the ball has been neatly finished it is put into another set of tools similar

The special features in favor of these tools are; they do all the forging of the one shape and size: the job is finished without a hammer mark, and



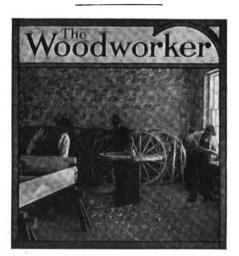
TO MAKE A NUMBER OF SHACKLES OF THE SAME SIZE

to C which punches the eye of the shackle. These tools are made the same as A and B except that they are depressed only to about one fourth inch and a 1-inch pin is left standing up in the middle. These tools flatten the eve to the required thickness and also punch the hole for the eye. Only a few heavy blows are needed in tool C after which a 1-inch drift is quickly inserted, which drives the burr out of the hole and leaves the eve with a clean finish.

The next detail is to bend the shackle. To do this, a pair of tongs made as shown at D are used. One jaw is made the exact shape of the shackle, and about twice as thick as the diameter of the iron of which the shackle is made. The bottom jaw is made similar to the jaw of regular tongs except that a pin or stud is welded on which is to pass through the eye of the shackle and also fit a short way into a corresponding hole in the top jaw of the tongs.

To operate these tongs, the end of the shackle or, properly speaking, that which is to be the shackle, is placed between the jaws with the pin of the bottom jaw passing through the hole. The tongs are now closed and held firmly, and a lever with a small wheel attached, and also a small pivot which drops into a hole in the top jaw is brought into operation. This lever is placed on at X, and while the iron is fairly hot it is pulled quickly to Y which completes the shackle. The jaw is now opened and the shackle drops out ready for use.

would give the appearance of having been moulded and, last but not least, when a large number is to be made they can be forged quickly and soon pay for the expense of making the tools.



Here's a little kink about wheels going back, which I would like all my brother smiths to know. When you have a buggy wheel dished back, all you have to do is to take the tire off, heat it, reverse the tire (that is put the front to the back), and put it on. You will find that nine times out of ten your wheel will come back without screwing it down or even hammer-L. N. Dupuis, Quebec.

How to Make a Spoke Puller. ALEX MOORE.

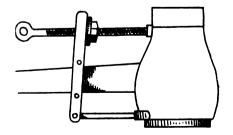
We had a set of wheels to cut down and rim this week and, as the two hind wheels were badly dished, we decided to pull the spokes and redrive them, but as they had been glued in they seemed immovable. So I just made a little device to pull them with, and as I wish

to give my neighbor smith the benefit of my find I will just give you a description of same.

Take a piece of iron one and a half by one half by six inches, weld a piece one and a half by one fourth by three inches on one end, and drill a 76-inch hole in the other end. Now take two pieces one and a half by one half by eight inches, bend each a little at one end so they will clamp over the first piece, making a space between them wide enough to straddle the spoke. Drill three %-inch holes in each piece, one at end that is bent, one three inches from that and another two and a half inches from the last one. Now make an eye bolt seven eighths by six inches, cutting a thread nearly the whole length. Put a nut and a large washer on and place your clamp on the spoke with the first piece down and the end against the hub. Now bolt the clamp tight on the spoke and place the eye bolt through the space between the clamp at top with nut and washer next the hub. Put a piece of flat iron between the end of eye bolt and hub so not to bruise the hub, and take a piece of round iron for a lever to turn eye bolt with and you can pull the tightest spoke.

A Device for Dressing Spokes. O. A. BROWN.

I use a method of dressing spokes for hub mortises that I have never seen described. Take a piece of board five eighths of an inch (ceiling is best), three inches wide and twenty-seven Bevel it from three inches long. fourths of an inch wide at one end so that at twenty-four inches from narrow end it will be two and a half inches wide. Now tack a thin strip on the straight side; three eighths by one and a half inches is a good size, now measure your mortise and then find the same measurement across the face of the



YOU CAN PULL THE TIGHTEST SPOKE

tapered board. Take your spoke, lay face side on back strip so that the top of the tenon is on the mark on the tapered piece. Then mark spoke on the bevel and cut away to mark. You

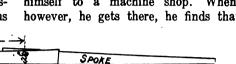
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will then have spokes set to give the proper dish to straight spoke wheels of ordinary make.

The Apprentice Question. DAYTON O. SHAW.

In writing these articles I do not expect to solve a problem so difficult and far reaching as the apprentice question. I only hope that if the suggestions

with his present knowledge, works a third apprenticeship to learn how to handle steel. He is now an all-around smith, but at what a cost-nine years of apprenticeship! Is that encouraging for a young man? Sometimes a man may get tool dressing in a job shop and give so good satisfaction that he lets himself to a machine shop. When, however, he gets there, he finds that



-TO DRESS SPOKES FOR HUB MORTISES

I make are not acted upon they may lead to something more practicable.

One question which is often asked is why are there not more learning the trade? Now, the condition of things seems to be this-there are only a few who are fitting themselves for this work. There are only a few all-around smiths and there are few well-trained men. If this is true there must be a cause, and that, I think, will be found in the beginning of the apprenticeship. First, there is difficulty in getting a chance to learn all branches of the trade; second, there is so much specializing work; and third, the apprentice does not have proper instruction. There may be other causes, but I will only mention these at present. Now, who will champion the cause of the blacksmith apprentice unless it is the blacksmiths themselves? Reader, does this appeal to you? If it does, won't you help push the thing along?

I have said there is difficulty in learning all branches of the trade. To illustrate, take a man who has a good business but who is deep in debt. He may be a good fellow, but he is obliged to work every man where he will pay him the best in order to meet his own expenses. The apprentice serves his time here and then goes to another place. There he is given a kind of work which he has not had practice in and he gets at it so awkwardly that the foreman tells him he had better go back and finish his trade. Consequently, he leaves and goes to another shop. At each place he learns something and in time becomes master of the art, but it is a hard, slow process.

Again, a young man may meet with a similar experience, not because he is kept back but because only one kind of work is done in the shops he enters. Perhaps he begins in a forge shop, then concludes he would like to try horseshoeing and serves still more time in a shoeing shop and, finally, dissatisfied there is something more than tool dressing to learn. Nevertheless, he may get along if he is agreeable and willing

work should be done, but their eyes have become weakened so that they cannot discern the different degrees of heat when the steel is in the fire. If the smith will follow their directions they will help him along until he becomes master of the art. On the other hand if he goes into the shop with a swelled head (and thinks he is "It") he might as well roll up his apron and take his departure. One can readily see the position a man is in when he undertakes to do a branch of work which he has not fully learned.

Again, the apprentice is often hindered about learning the different branches of the trade by working with smiths who do not fully understand what they try to teach, besides, the

The Eldora Plow and Blacksmith

Is the only firm we know of who has ever bought and used advertising space with the purgose of reaching but one customer. Other men and firms doubtless have used space without accomplishing even that much—but we don't remember of anyone else starting out with that definite idea in mind. Here is the advertisement, and the idea that definite idea in mind. is not at all a bad one. Logical-is it?

We want this advertisement to catch the eye, rivet the attention and appeal to the best judgment of just one big, broad-guaged man

A man with enough discrimination in his mhke-up to see, and sufficient interest to take advantage of what he sees.

Are you the man? Here's what we have to Say, with a big S:

We shoe horses. We have been shoeing We have not been horses for 25 years. 25 years in one business without learning something. We know our business. You know us, and you know what we can do, and we know that there is no one in the State of Iowa who can shoe horses any better than we. We shoe them the way they ought to be shod

wow this question—Is there any reason why you-should not patronize men who have made horseshoeing a life study?

Your answer cannot be any different from others, and that is, "There is no reason." Then do as others are doing, and bring your horses to our shop

The discriminating gentlemen we are talking to, whether farmer or merchant, wants the best. There is no reason why they should not have the best. The question then is—not how much, but how good.

Now, you own a horse. That horse must be shod. We can shoe it and shoe it right, This is not a claim without any foundation. we know we can do it and do it right, for we do it every day, six days in the week. You will know it too, if you will bring the horse to our shop.

Does your horse interfere? Has your horse bad feet? If either is the case, we can remedy it. We can stop the interfering and make the bad feet good.

Our years of experience makes it easy for us to guarantee our work. We understand the horse's hoof, and know how to make shoes that will make the horse go. can please you, for we've got lots o of particular customers, and we please them

good plan for YOU would be to bring in YOUR horse the next time it needs shoeing, and prove and see for YOURSELF. What do YOU say?

LIGOTO PIOW ONG BIOCKSTRIER CO.

ELDORA, IOWA.

A Good Team Badly Shod, is Worse than No Team at all.

OUR SHOEING IS CORRECT.

DOES ADVERTISING PAY?

The Eldora Co. says "This makes it possible for us to get better prices than other shops."

to learn, for there is in nearly every shop old machinists who have worked steel for years. They know how the

equipments in many shops are poor. For instance, a short time ago I called on a friend of mine. As I stepped into Digitized by

the shop he was standing at a hardening bath. "I am glad you have come," said he. "I am in trouble." "What is it, Jack, old boy?" I asked. "Well," he replied, "I had six pieces to harden. I have cracked four and I was just thinking whether it was best to spoil the other two or stop right here." Then he began to question me about baths. long to the old and regard the new with suspicion?

(To be continued.)

EDITOR'S NOTE.—The importance of the apprentice problem does not need emphasizing; as every craftsman, with the welfare of the trade at heart, knows well the lack of apprentices. What the result of this condition is likely to be in future years, unless remedied, can, of course, only be surmised. Mr. Dayton O. Shaw in his articles "I've been wanting to see you for some time," said the Editor. "There are a number of things I want to talk over with you, and we may as well go over them now. In the first place, I want to know if you have a good recipe for hoof ointment in that book of yours. Here's a reader wants to make a hoof ointment that will fix up

dry, brittle hoofs."

"I just got hold of a good ointment recipe from an old shoer up in Michigan,"



AN OREGON GENERAL SHOP RUN BY MR. J. M. HILLIARD



AN OREGON SMITH'S RESIDENCE. MR. J. M. HILLIARD'S HOME

While we were talking I looked at his forge. He had an old-fashioned bellows and away down next to his tuvere iron was a little fire of ashes and cinders about as large as your fist. "Well, Jack," said I, "with some work we have to be particular about our baths. but this time the trouble is not in your bath, but in heating. With such an equipment as this it is difficult to do good work. With those bellows you get too much blast or none at all. If your work is long or quite wide you cannot get an even heat with a little round fire. With an extension tuyere iron you can have a long fire if necessary, and with the modern blower you can get a light, steady, even blast, which is required for up-to-date work.

Some may say that they have got along with the old equipment and do not care to change. That is what the farmer thought about his axle. He had always used a wooden one but one day his blacksmith persuaded him to get a steel axle. The next time the farmer came to the shop the smith asked him how he liked his new axle. He said that he did not like it as well as he did the old one. "The gol darn thing," answered the farmer, "pushes harder down hill."

So it is, boys, with modern tools, they will push harder if you speed them up. I do not insinuate that all farmers are like the one mentioned nor all blacksmiths like Tom Hardy. Is it not true, nevertheless, that we often cling too presents many sides of the question and covers the subject quite thoroughly. He brings out some phases of the subject that will no doubt be new to readers, and then he goes a step farther than some writers by offering a solution to the problem. We invite discussion on this subject. If you have ideas on the matter let us have them for publication. The solution offered by Mr. Shaw may not concur with your views, but Mr. Shaw says: "You may criticise on one condition: That you suggest a better remedy."



"Well, Benton, old man, haven't seen you for some time," and the Editor, after shaking hands with the man of recipes, handed him the cigars and pointed to a chair.

"I've been out of town for the past few weeks," said Benton as he removed his coat and prepared to make himself comfort-able. "Been up to see my brother in Michigan and have had a very good time of it.

replied Benton. "I've got it here somewhere," and Benton pulled a batch of papers from his pocket and glanced over them. "Ah! here we are. Take two parts of white resin and one part of yellow beeswax and mix them together. Then add two parts of mutton tallow to the mixture. When these are melted and mixed add two parts of Barbadoes tar and one part castor oil, and then stir the compound until cool.

"How is it used?" asked the Editor. "Wash the feet." returned the other. "and rub the mixture into the hoof with the hands. The ointment is also good for affections of the skin, and, I was told, is one of the best ointments made."

"I think that is just what our reader wants," said the Editor. "Now, what—"

But Johnson interrupted further conversation by appearing at the door, quite excited.

"What's the trouble, Johnson. Your best horse gone lame?" inquired the Editor. Johnson is quite a horse-lover.

"How did you guess?" returned the newcomer. "I was out this morning for a spin with the flyers on the speedway and during a brush with Billy Lewis' mare my animal tripped or stumbled and sprained a tendon. Well, I could hardly get the colt home. The leg seemed to be very painful. I bathed it in hot water and then bandaged it very tight. Is there anything else I can do?" and Johnson turned to Benton.

"Well, hot vinegar is very good, Johnson," replied Benton, "and I've heard that the addition of salt will help. Bandage with both the hot vinegar and salt as often as possible and you'll find your horse in good shape in a few days."

"You've taken a big load off my mind," returned Johnson. "I was just about to go down to the doc's, but I'll try your hint before I turn any of my cash over to the veterinary."

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The Wonderful One-Hoss Shay.

The author, Oliver Wendell Holmes, was born in Cambridge, Mass., August, 1809, and died in October, 1804. He was professor and lecturer at Harvard Medical School for thirty-five years. His verses, "Old Ironsides," flew from one end of the country to the other at the time the Navy Department was about to destroy the frigate "Constitution," and eventually saved the old man-of-war. Every one who knew Dr. Holmes loved him. One cannot look upon even his pictures without feeling the sunshine of his spirit.

Have you heard of the wonderful one-hoss · shav.

That was built in such a logical way
It ran a hundred years to a day,
And then, of a sudden, it—ah, but stay,
I'll tell you what happened without delay:
Scaring the parson into fits,
Frightening people out of their wits—
Have you ever heard of that, I say?

Seventeen hundred and fifty-five:
Georgius Secundus was then alive,—
Snuffy old drone from the German hive.
That was the year when Lisbon town
Saw the earth open and gulp her down,
And Braddock's army was done so brown,
Left without a scalp to its crown.
It was on the terrible Earthquake day
That the Deacon finished the one-hoss shay.

Now in building of chaises, I tell you what, There is always somewhere a weakest spot,— In hub, tire, felloe, in spring or thill, In panel, or crossbar, or floor, or sill, In screw, bolt, thoroughbrace,—lurking still.

Find it somewhere you must and will,—
Above or below, or within or without,—
And that's the reason, beyond a doubt,
That a chaise breaks down, but doesn't
wear out.

But the Deacon swore (as Deacons do, With an "I dew vum," or an "I tell you") He would build one shay to beat the taown 'N' the keounty 'n' all the kentry raoun'; It should be so built that it couldn't break daown:

"Fur," said the Deacon, "'t's mighty plain

Thut the weakes' place mus' stan' the strain;

'N' the way t' fix it, uz I maintain, Is only jest

T' make that place uz strong uz the rest."

So the Deacon inquired of the village folk Where he could find the strongest oak, That couldn't be split nor bent nor broke,—That was for spokes and floor and sills; He sent for lancewood to make the thills; The crossbars were ash, from the straightest trees;

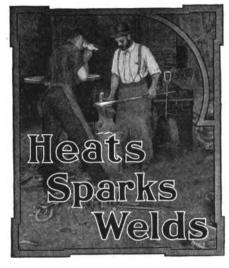
The panels of whitewood, that cuts like cheese,

But lasts like iron for things like these; The hubs of logs from the "Settler's ellum," Last of its timber,—they couldn't sell 'em,— Never an axed had seen their chips,

And the wedges flew from between their lips,

Their blunt ends frizzled like celery-tips; Step and prop-iron, bolt and screw, Spring, tire, axle, and linchpin too, Steel of the finest, bright and blue; Thoroughbrace, bison-skin, thick and wide; Boot, top, dasher, from tough old hide Found in the pit when the tanner died. That was the way he "put her through." "There!" said the Deacon, "naow she'll

dew.''
(Concluded next month.)



Good advertisements are links of gold in the business chain.

Some men—and some are smiths—borrow so much trouble that they're always in debt.

Everything that comes the smith's way belongs to him—but that which he goes after does also.

A change is not always for the best, but it shows you are alive—and sometimes that's necessary.

The man who waits for opportunity usually finds that some other chap has gone up the road to meet it.

John Hogan says: "I love horses and I like to see 'em treated right," and his customers know it.

Taking the bull by the horns is commendable, but 'tis important that you let go at the right moment to avoid the crash.

When a man spends a dollar with you he has a right to know what he is getting for the dollar. It's up to you to explain.

Too bad more men aren't like the hen, she pays strict attention to her business of laying eggs and endeavors to do better each time.

"Sticking up for methods and things simply because they're yours is another way of starting toward failure," says Thornton.

Rather than knock the work of your competitor, make him jump for business by putting a great, big quantity of energy into your own.

"Mine Fadder always said: 'Hans, mine poy, always mind der P's and Q's,' 'und I dink it vas Prices and Qualities he ment,'' said Hans Pickledill.

When your supply is low ask for more. Don't wait until you are entirely out of them. Simply say "more Pink Buffaloes." We've got lots of them.

'Tis not always the man who knows the most that makes the biggest success. The man who sticks closest to his job has a better chance for making good.

Two prices there are to everything—the cost price and the selling price. Make it your business to know both intimately—don't be content with a mere passing acquaintance.

Is there a smith in your vicinity who continually kicks about the craft "going

to the dogs?" Get him to take "Our Journal" for a year and see his frowns change to smiles.

At the present rate of progress made at Panama 'tis said that the big ditch will be dug before 1913. This will be three years earlier than the most hopeful estimate made heretofore.

Don't let this new year slide by without getting at least one new subscriber to "Our Journal." Better do it now before you forget that it means six months' credit on your own subscription.

Government reports state that 1,700,000 horse-drawn vehicles were built in this country last year. Of these 1,000,000 were for pleasure while 800,000 of the latter were two-passenger vehicles.

A gate valve, said to be the world's largest, has been installed in a Niagara Falls power plant. It contains over sixty tons of metal and the parts are over nine feet in diameter. It is large enough for a man on horseback to ride through.

"Collections are bad" said Friend Tardy.
"It seems funny—I don't bother the life out of my customers. Now, today is the first time I've gone out to collect in eight or nine months—they don't nobody seem to have any money." Better try "bothering the life out of them," Tom.

One grinding wheel can seldom be used on all work without a greater loss of time than the change in wheels would require. The time saved in grinding a single piece often saves more time than it requires to change the wheel. Never use the wrong wheel on a job because it will require a few minutes' time to change to the right one. It pays to change.

A bit that bores square holes has been invented by a German. The device is being introduced into America, England and France, and can be used not alone on wood, but also for boring cast iron, steel, brass, and practically any metal and also stone. Then, also, besides the boring of square holes, triangular and holes of five, six or more sides can be made.

Deliver a square deal to the future craft by dealing squarely with your apprentice. Teach him the trade—its ins and outs—its pitfalls and snares—its possibilities and opportunities. Teach him to take it seriously. Teach him what you have learned. Make it your object to start him in the trade with just the very best knowledge of the trade that you can give him. A square deal to the apprentice, and the future craft will care for itself.

Once upon a time a man brought a broken casting to the village smithy to be repaired. He said he would lose almost a week to await the arrival of a new part from the factory and that he could not afford that much time. Incidentally he mentioned a neat sum for the repairing of the break. The smith started to work. He worried and fretted and fumed, but "an ant may work its heart out, yet it cannot make honey." So, also, a man may work with all his might, yet he cannot accomplish that of which he knows nothing. It took that smith an entire day to do the job, and then he did it only because he remembered receiving a sample copy of THE AMERICAN BLACKSMITH from his neighbor only the day before.

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American Association of Blacksmiths and Horseshoers.

The past month has seen unusual activity in association circles. Little seeds of organization have been planted in many counties and the work of craft cooperation is being gradually pushed. Isn't it most time that your county got in line? Isn't it about time that you were getting a living price for your work? Isn't it time you had some protection against the "dead beat" and "slow-pay" customers? These are a few of the advantages offered by organization and coöperation. If there is no organization in your county I want you to ask for my help in forming one. Just drop me a postal—ask for my easy plans -get my help-and before you know it you'll have an association in your county that will gain for you and every other smith in the county the reforms you should have and are entitled to.

Consider this a personal letter to you. Don't think I mean this for someone else. I am talking to you and want you to send me a postal-card request for my easy plans. Just address me at P. O. Box 974, Buffalo, N. Y. It will take but a second, cost but a cent and may mean a great deal to you. Will you write, right now?

THE SECRETARY.

Gun and Novelty Repairing 4.* w. A. MUMMA.

Work on Rifle Barrels.

The old-style rifle barrel was made from refined iron worked well under the hammer, but the modern, up-to-date breech-loading barrels are made from decarbonized steel with all the carbon worked out, leaving it soft and tough, with a fine grain. Some of the breech-loading barrels for the use of the nitro powders and other high-power explosives are made from the alloyed steels, such as nickel steel.

The old-time rifle barrels were made by forging out, taking a piece of iron, say about two inches in diameter and eight or nine inches long, and boring a hole through it of about the size of bore intended; then placing an iron rod through it and then heating it to a forging heat. This was then hammered out on the anvil until of the desired length and size, when it was straightened and finished up and then rebored. But for some time past the following method has been used: A piece of steel or iron is taken, of about two inches in diameter and nine or ten inches long; a small hole is bored its entire length, and it is then heated and a rod passed through it. It is now passed through a set of rolls with grooves of successive sizes until it is rolled to the desired length and size, either octagon or round. It is now ready for finishing and reboring by a machine or a lathe, made especially for the purpose. The boring is done while the barrel revolves and the boring tool is pulled through by suitable gearing.

An engraving of the boring tool is shown at Fig. 1. If the guide goes before the cutter it can be one and a half or two inches long. A small recess is made between the guide and cutter for the cuttings so as to prevent the tool from binding. The cutter is made in the form of a cherry and of course light cuts are taken. If one cut is not enough another cut is taken with a larger cutter. If the boring tool is pushed through the barrel the guide is placed in front of the cutter. A straighter and better hole is made by pulling the tool through. The tool is not so liable to spring out of true This boring tool can be used for reboring old barrels for rerifling.

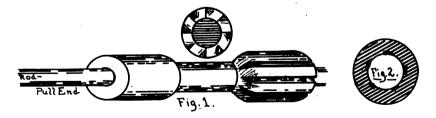
The barrel is now ready for testing as to straightness and the accuracy of the bore. There are several methods for testing for straightness. Fasten a piece of white paper on the window pane, make a straight, black, perpendicular mark on the paper and look through the barrel at the line on the paper. If the shadow of the line is not straight in the barrel, the barrel is crooked. Another way is to insert a slip of card into the muzzle of the barrel; the card slip need not be more than one quarter of an inch wide. Then place it in barrel crossways of the bore, with

light or heavy blows on the outside of barrel.

After the barrels are tested and finished up inside they are ready for rifling, or for cutting the grooves. The finishing is done by using cutters or reamers very similar to the one described for boring out, only it takes a very fine cut, or just merely scrapes the surface. After the grooves are cut the barrel is cleaned and finished by using emery paper, or powdered emery applied on the end of wiping rod.

The size of the bullets of the old muzzle-loading rifle was made most anything, there being no standards. If a barrel became worn inside it was simply recut and the bullet mold reamed out to size. And as there was no fixed ammunition to use, there was an unlimited range of sizes, from two hundred to thirty or forty balls per pound. The old army musket was, of course, made to certain standard sizes.

The rifling of the muzzle loaders will be first considered and then the breech loaders. What is meant by rifling is the cutting of the grooves. There are several points to be considered in cutting the grooves: First, the number of grooves. There should not be less than three, nor more than seven. Five is about the right number. The small sizes need to have very narrow grooves, while the large sizes very wide grooves. The large calibers also have more grooves than the small sizes, or the large bores may have a small number of grooves with very wide lands. The old muzzle loaders were generally made with wide lands and narrow grooves. Engraving, Fig. 2, shows a bore of a gun showing the



A BORING TOOL AND A SECTIONAL VIEW OF RIFLE BARREL

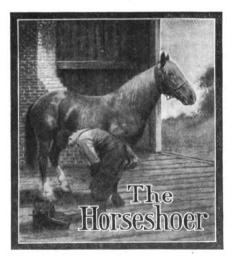
the edge of slip towards the end; have it large enough to fit the bore tight, so it will stay in place upon looking through the bore to the light. The shadow can be readily seen by having the slip properly placed. Wherever the concavity shows on the inside of the barrel correct it by striking a blow with a hammer. It takes some practice to adjust the distance that the mark shall be placed from the barrel, and also to locate the exact spot or place of crookedness in the barrel, which is then corrected by

grooves and lands. The lands are the spaces between the grooves. The bullet is forced into the grooves, which give it a rotary motion, enabling one to shoot with more force and accuracy than if the barrel were smooth bore. Second, the depth of the grooves varies with the different kinds of guns and the size of calibers. For very large sizes the grooves are shallow. It is claimed that deep grooves shoot harder. The depth of the groove is a very small fraction of an inch; one thirty-second of an inch

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would be a very deep groove. Third, the amount of twist that is given the old muzzle loaders varies, and ranges a turn in from thirty to forty-two inches. The old army guns had less twist than hunting rifles, some as little as one turn in about seventy inches. The more twist to the grooves, the harder the gun will shoot and the more accurately. At the same time the barrel is harder to keep clean. The patched bullet prevented the bore from becoming leaded, and about all the dirt that was made was from the powder. Some guns were made with a "gain" twist, meaning that at the muzzle the twist was slightly greater than at the breech, giving the bullet a gaining twist as the bullet proceeded from the gun. Most generally, all rifles are made with a regular twist, that is, as much at the muzzle as at the breech. Increasing the amount of twist increases the velocity and accuracy, but there is a limit to the amount of twist, for the bullet is apt to jump the rifling if the twist is very sharp (say one turn in sixteen inches), and especially if the barrel becomes very dirty. It is more necessary to increase the twist with a small bore than with a large one, and the object of a "gain" twist is to have better shooting qualities for very long range. The sides of the grooves are generally cut with their sides corresponding to the radius of the bore.

(To be continued.)



How to Steel-Plug Horse Shoes.
R. H. GLEASON.

There are two ways of preparing horseshoes so they will wear sharp—either method is good. One method is to split the calk and insert the steel and is used on new work. The other method is better adapted to light work and old shoes. Some split the heel, as at A, and drive the steel in before the calk is turned. They close down on the steel

and then weld and turn heel at same heat. Others turn the heel, split it and then drive in the steel, as shown at C. They then close it down, dip in borax, take a weld and draw sharp with same heat.

The process for old shoes and light work is to take a steel sickle section, place in vise and break in pieces one and a quarter inches long, tapered from one half to one quarter inch. Now drive pritchel (as at E) into heel of shoe about one half inch from heel calk. Then drive the sickle point in, heat and lay the piece down on the calk with the pene end of the hammer. Be sure to drive the steel down level with the iron. Now dip in borax, give it a good welding heat with steel up in fire and weld with pene against shoulder and the calk will appear about as at F. After shoes are fitted heat each calk bright red and dip in water. These calks will stay sharp all winter, even on bare ground, as the iron wears away and leaves the calk with a sharp edge at all times. For steel plug work we use the Jackson toe calks. They are very good, but the price is high. If some steel men would make a hard center steel there would be a fortune in it just for toe calks. They could be sold by the ton at a big profit.

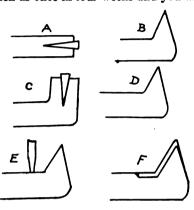
Lame Horses and What the Shoer Can Do For Them.—2.

E. H. MALOON.

Coming down the leg we have the coronary band next. Here is made all tissue that goes into the outside shell of horses' feet. If we want to make more shell we blister the coronary band. The coronary band, coffin bone and the foot's supply of blood are very closely related. To get at this right we have the coronary band that supplies the coffin bone that is covered and rounded out with this tissue and covered with a great many blood vessels and arteries. Now for trouble: Back in the horse's body there is a failure to supply the coronary band with good, tissue-making blood. Hence, the coronary band fails to supply the nice soft tissue required to keep the shell of the hoof off the coffin bone. The shell shrinks and there is friction. The foot gets hot as the tissue disappears. The shell keeps shrinking and the blood vessels cry for more room. Instead of circulation vou get congestion. Soon inflammation comes, the horse is lame and the shoer is blamed for pinching the horse's feet. How ridiculous!

When they talk to me about who is to blame for this condition, I tell them

like this, "Begin away back and take care of your horse in such a manner that his blood will be good. If you drive him hard, take care of him in a reasonable manner when you stop him—let him get into a normal condition before he takes any food into his stomach. Let an intelligent smith shoe him as often as once in four weeks and you will



HOW TO STERL-PLUG CALKS

have no lame horse from contracted feet." This theory may be right—it may also be wrong. The horse cannot tell and no man knows, but one thing is sure, to me it seems good common sense, and working by this theory I can always help a horse and give him relief and, excepting old cases, make him go sound.

My way of helping a horse with contracted feet is, first to have the owner build up his blood as well as he can. Next, put a good blister on the coronary band once in two weeks, until you have blistered him three times. This is the right thing to do if the owner will do it. If he won't, I do the best I can alone; first by removing all of the surplus hoof from the bottom of the feet, and put on a thin heeled shoe or a tip, or a bar shoe, with a good wide bar made like a heart, using leathers and pine tar, giving him a frog pressure. I claim that when I have done this I have done all I can with the shoe. It is now up to the owner to get his horse sound, first by doctoring his blood, second by blistering as described, and in other ways as follows: Have him shod as often as once in four weeks, poultice his feet in linseed meal, soak them in hot water, put feet in soaking boots, put axle grease on the coronary band and, in fact, any way to loosen the shell from the coffin bone so blood can circulate. Now, if the blood vessels and arteries have not been destroyed, the horse will go sound, for we all know that with plenty of good blood circulating through the foot and being shod often the foot will not contract. Now, my reasons for this assertion that it is the blood and not the surrounding circumstances that makes feet contract. We all know that a horse in pasture has nice sound feet. To my mind this comes about by his food, which is natural and cannot be improved upon by man. I will say, if it is the moisture instead of the food, why does hot water leave the foot worse if it be discontinued without doctoring the blood? This holds good in all outside applications. We at one time softened the shell. To my mind the only true remedy is to shoe, doctor and blister as I have described, and wait for nature, using these outside remedies for immediate relief. Contracted feet are the beginning of much trouble for the horse forward, and I say in all sincerity to the horse owner, let your horse go barefooted or take care of him under the instructions of a good veterinary, but don't blame the shoer as soon as your horse's foot grows small and he shows signs of tenderness.

(To be continued.)

Horseshoeing, Yesterday and Today.

A. L. DARCAS.

If I understand Brother T. H. Bennett correctly he tells us that horses shod a half century ago were shod more correctly and scientifically than horses shod nowadays. In olden times you had not the opportunity to read a dozen or more different blacksmithing and shoeing journals. The apprentices had no opportunity to read. They were not allowed to visit the neighboring blacksmith and horseshoeing shop. The apprentice had to work from five in the morning till nine at night. They had to split the horseshoe bars out of old tires and the nailrods they forged out of old shoes. Do you think, for a moment, that the apprentice would have felt like it if he had had the chance to read an hour or so? No, he was glad to retire, all nervous and as tired as an old boat mule. And the next morning his boss would almost break in the door and say, "Get up! It is five o'clock and we have no horsenails on hand." Now, just at this time nail-making was rushed, and what was the result? They were all number eight and split points at that. And the shoes, why you could not find two alike in the shop.

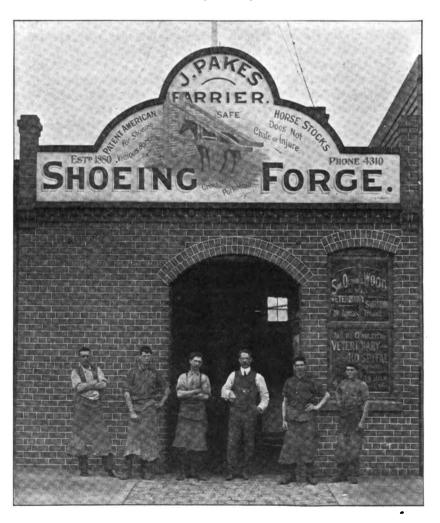
Today you can buy a carload of any style and size, all true in style and number. Horsenails you can buy by the ton and they are all perfect and sure. Nowadays if a shoer in California patents a new shape and style shoe we in the East will hear about it very shortly. Now, I defy any man to prove that better shoeing was done half a century ago than in this moving and enlightened age of ours.

I cannot agree with Brother Bennett concerning toe and side clips. I clip eight out of ten, but I use common sense in drawing and fitting. The clip should not resemble the old-style plough share, so that it is necessary to use the sledge to hammer it down. I have horses in my custom that I feel safe to say would not hold their shoes without clips. They would be kicked out of place and the nails would press the inside hoof and consequently do more pinching and squeezing and get the hoof in the very jaws of a vise, as Brother Bennett has told us in the November issue. I can truthfully say that I can credit the better half of my experience on shoeing to reading valuable journals and books that have been written by and I beg my brethren to be more liberal in their discussions. I always enjoy reading real knowledge and experience, but I dispense with guesswork. I hope and trust I shall hear from at least a dozen brothers on this subject.

How to Make Simple Brass Castings.

ETHAN VIALL.

Where any amount of brass casting is to be done or where the pattern is complicated it would be better to have the work done in a regular brass foundry by men experienced in molding and in making the different mixtures of brass and who have every facility for turning out good, durable work. However, there are many articles such as bushings, journal boxes, washers, rings, plugs and other small single brass castings that may be made by almost any blacksmith, and thus save time, expense and often many miles of travel.



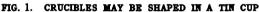
AN UP-TO-DATE SHOEING SHOP OF AUSTRALIA

up-to-date professional and experienced men. Now, I want to be distinctly understood. I am not one of those "knowall" fellows, but I must learn every day In casting brass it must be kept in mind that this metal shrinks from % to % of an inch to the foot while cooling, depending on the mixture, and so the

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pattern used must be so made as to allow plenty of metal for both shrinkage and machining. In making flat brass washers it is often better to cast just the time to send for one, in which case crucibles similar to those shown in Fig. 1 may be made. These crucibles were made of a mixture of fireclay two parts, Crucibles holding ten or fifteen pounds may be made in this way, using a ladle or bowl with a flaring top. Brass melted in as open a crucible as this oxidizes





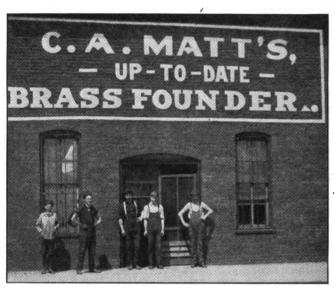


FIG. 2. A TYPICAL BRASS FOUNDRY AND THE WORKING FORCE

a flat disk and drill or bore out the hole in the center rather than to core it out. This, of course, depends on the size of the washer wanted and the means at hand for drilling out the center. For the class of castings just mentioned no elaborate molds are needed. A strong wooden box of suitable size, filled with fine "clingy" sand well packed, being the main thing.

If a brass bushing is wanted, say three inches long, three inches in diameter and with a hole two inches in diameter through the middle, a wooden pattern may be made or another bushing may be used, always remembering to allow for shrinkage and finishing. This pattern is set on end in the box, in which several inches of sand has already been placed, and sand tightly packed around the outside and in the hole, using a hammer handle or iron bar to ram the sand in tight. Gradually pack the sand up even with the upper end, shape up a little trough or basin to guide the melted brass and then carefully pull out the pattern. Several trials may be necessary before the pattern is pulled out without breaking the core or filling the mold with sand. Solid or shallow patterns are much easier to remove than those that make their own core.

For castings weighing only a few pounds the brass may be melted in an ordinary forge. Iron ladles are not suitable for melting brass, and crucibles of all sizes from one-half-pound capacity up may be bought. But usually when a smith wants to melt a few pounds of brass he has neither the crucible nor flake-graphite one part and two teaspoonfuls of salt to each pint of the mixture used. This was thoroughly mixed and kneaded with the hands, using just water enough to make a smooth paste and then put into a round bottom tin cup and molded into shape with the fingers, leaving the sides and bottom about five-eighths to three-fourths-inch thick. They were then placed close to a stove over night to dry out nicely and the next morning they were placed in a forge with a deep fire, using a moderate

rapidly on the surface and must be carefully skimmed with a small rod or stick before pouring. Finely powdered charcoal is good to sprinkle on the surface to prevent air from coming in contact with the melted brass and causing oxidization, but this is not absolutely necessary, though it prevents wasting some of the metal.

The fire used while melting the brass should be deep and the blast moderate, and at no time should a crucible be subjected to a sudden, fierce blast of heat



FIG. 3. ONE SIDE OF THE MOLDING FLOOR

blast, and gradually heated. When hot they are ready for use and can be handled easily with a pair of light, longnosed tongs without fear of breakage. or air. If the crucible is of good size it is well to build up around it with fire brick banked with coal and cinders to confine the heat. It is better for the

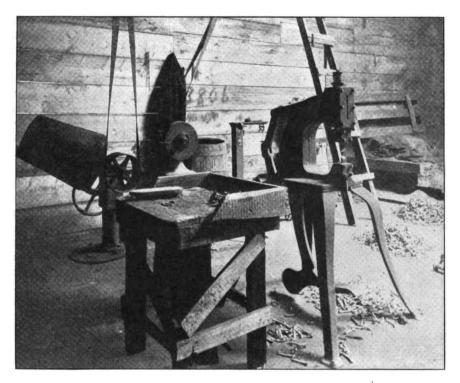


FIG. 4. ANOTHER CORNER OF THE BRASS FOUNDRY

smith to use old scrap brass for melting than to try to mix his own, but for those



FIG. 5. THE TOPS OF THE FURNACES ARE LEVEL WITH THE FLOOR

who wish to experiment the following mixtures are given.

For ordinary castings:

Copper, 88 parts,

Zinc, 8 parts

Tin, 2 parts,

Lead, 2 parts.

This gives a fairly soft, easily machined casting, but for bushings or bearings use:

Copper, 88 parts,

Tin, 10 parts,

Lead, 2 parts.

In buying tin for this last mixture, tin with enough phosphorus in it to make a two-per-cent mixture should be bought. These two mixtures are used for the all around work that comes to a well-known Chicago job foundry. Other

formulas may be obtained from almost any metal handbook.

In making any brass mixtures the general rule is that for hard castings more tin is used and for soft castings less tin. A small amount of lead makes the brass run better and machine easier. There is a great deal of difference between a brass and an iron foundry, and many who have been familiar from boyhood with the looks of an iron foundry have never seen a brass foundry.

In many of the factory buildings of the large cities brass foundries are placed on the second or third floor, or even higher, which would be impossible in the case of an iron foundry. In order to give those readers of THE AMERICAN BLACKSMITH who have never been in a brass foundry an idea of how one looks the accompanying photographs were taken at the foundry of C. A. Matt, of Thirty-eighth and Halsted streets, Chicago, Ill. This foundry is typical, both in size and equipment, of the average brass job foundry. One noticeable thing is the small working force employed, though the value of the product is equal to that of an iron foundry employing two or three times as many men. Fig. 2 shows the front of the foundry and the entire working force, while Fig. 3 is a partial view of one side of the molding floor and benches. Fig. 4 shows a very handy type of tumbling barrel and a footpower sprue cutter. A number of small castings are also shown in heaps on the floor. Fig. 5 is a view of the melting furnace, the top of which is level with the floor. A big crucible is also shown. About one hundred and eighty pounds of brass can be melted in these furnaces in two hours. Only natural draft is used for the coke fires. Fig. 6 is a sectional view of one of these furnaces and shows the way a crucible is set in and the position of the

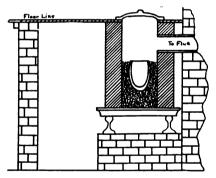
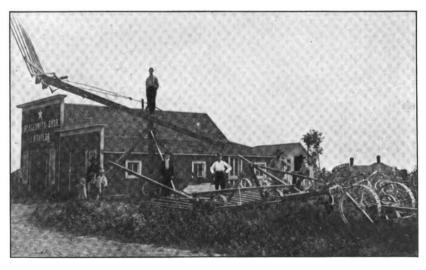


FIG. 6. SECTIONAL VIEW OF BRASS FURNACE

pipe leading to the flue. Draft enters the bottom through a grate.

From the foregoing a fair idea of the method of brass melting may be obtained.



STAR BLACKSMITH SHOP RUN BY MR. J. W. TAYLOR NEBRASKA

which, with a little experimenting, will enable the smith to make such ordinary brass castings as he needs. If, after he has successfully made solid castings, he wants to try some requiring a regular inserted core, a good all-around mixture for small cores is made up of

ten parts of good, sharp, rather fine river beach sand and one part common flour and mixed or "tempered" with molasses water. This is then molded into the shape wanted and may be baked in the oven of the cook stove till dry and hard, when it is ready to use.



An automobile radiator that has become leaky from one cause or another may be easily and quickly repaired by using some good waterproof cement. This can be used when solder will not answer.

L. K. S., Massachusetts.

The auto repairman often requires a washer of a certain thickness. To file one down by holding it with a pair of pliers or pincers takes time and is generally unsatisfactory. To do the job easily force the washer into the end grain of a piece of soft wood. Now, place the wood in the vise with the washer up, where the washer can be filed as thin as desired.

J. K., Illinois.

Repairing an Automobile Hub.

Most of the hubs on the wheels of automobiles are made so light that, when a key gets loose and the wheel goes wobbly, the annular section C, which faces against the cap on the end of the axle, bursts and grinds off to the bottom of the circular recess B. Owing to the thinness of metal at G it may not be practicable to set bushing in the usual manner. The accompanying drawings may help out some fellow craftsman when he runs up against such a propowithout removing the hub from the wheel and without removing the tire. This alone means a saving of six or eight hours' work on an ordinary wheel and tire. Bore out the end of the hub as shown in lower section of Y to receive bushing. If you have no lathe this bushing may be made of a section of tubing E, with collar F shrunk on it and dressed to make a drive fit. Then drive it home.

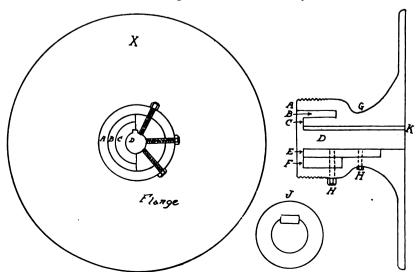
Now make six lag bolts of mild steel, threaded the whole length so as to come flush with the inside of bushing, as shown at HH. Drill and tap three holes as close to the edge of the dust cap thread as possible, exactly dividing the circle of the outer end of the hub. Then drill and tap three holes exactly dividing the spaces between these first three holes when facing the end of hub, and screw in the lag bolts tight. If the tubing is light you may now cut the key way. If the tubing is pretty stout the key way may be cut before setting bushing. In most cases you will find the key way in axle injured. Widen this key way a little and sink it



PREMIER MODEL 30 SPECIAL

sition. For this job you will find the boring bar which was shown in the February (1908) number very handy, as with it you can bore out the hub

just a trifle. The key way in the hub should be as shallow as possible, consistent with the strength. This can be managed by making the keys two thirds as thick as they are wide—in fact, as wide as you can without cutting too much out of the axle, as shown at J. A key of this shape is not liable to roll, even when loose, and under heavy pulls does not exert the tremendous strain on hub or bushing that a square key would. Keys should be of shear steel



MOST AUTOMOBILE HUBS ARE MADE VERY LIGHT

The Premier Motor Car.

and slightly tempered.

The accompanying engravings show the Premier "30" and parts. Fig. 2 shows the motor removed from the car and shows the intake side. Those readers who have followed this series of automobile talks will be able to readily pick out the various parts of the motor and their functions.

Fig. 3 shows a top view of a part of Digitized by

the engine and shows the make-andbreak connections and also the spark and battery connections. The aluminum cover plate to waterjacket is also shown.

In Fig. 4 is shown the rear axle housing, enclosing the floating axle sections and differential. The right end of the housing shows an internal expanding brake, while the left end shows an external contracting brake.

In Fig. 5 is shown a near view of a brake drum, showing details of the external contracting and internal expanding brakes.

Adjusting, Repairing and Caring for an Automobile.—4.

The Radiator and Pump.

In order to be efficient, a radiator must necessarily be made of very light copper tubing and sheet copper sweated together. The more flexible and easy riding a car is, the more severe it will be on the radiator unless the driver exercises a reasonable amount of care. Driving at reckless speeds over dark and uneven roads at night frequently results in dropping into bad holes or washed-out culverts and this is liable to open up leaks in the radiator. Ex-

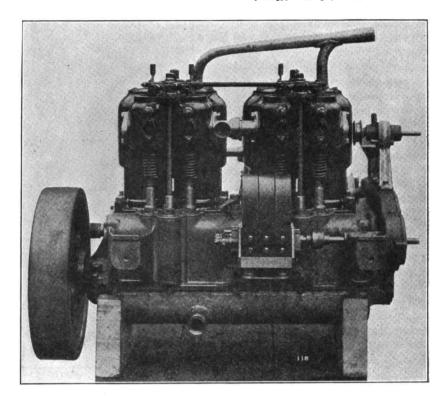


FIG. 2. THE INTAKE SIDE OF THE PREMIER ENGINE

pipe until clean. This done once a month will repay for the trouble.

Leaks in a radiator are usually caused

In turning from a level street at right angles up a stiff grade the radiator necessarily gets quite a severe wrench and persons driving in such places should exercise exceptional care. Few tinsmiths or others, unless they have had considerable experience in this particular kind of work, are equal to the task of repairing a bad leak in a radiator. The better way, therefore, is to send it to some person who is known to be an expert in this work, rather than take a

by severely wrenching it in driving over rough roads or in hilly country.

chance of more serious injury as a

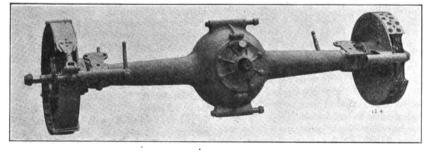


FIG. 4. REAR AXLE HOUSING ON THE PREMIER CAR

treme care should therefore be exercised in driving a car over bad and, especially, unfamiliar roads.

The use of clean, soft water, free from alkali and other salts will greatly lengthen the life of a radiator, and a frequent cleaning, by running clear water through the radiator as well as the entire water system, including cylinder jackets, will greatly increase the efficiency and retard decay by rust and other agencies. Disconnect hose and pipes between radiator and engine. Remove cover plate from pump; take the garden hose and let water run down through the radiator until it comes out at pump and petcock holes-pet cocks should be removed to allow freer flow. Then attaching garden hose to aluminum pipe on top of cylinders allow water to run through jackets and out through brass

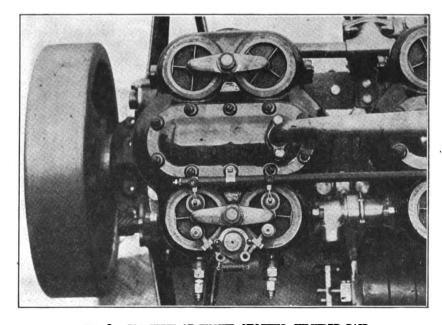


FIG. 3. TOP VIEW OF ENGINE SHOWING CYLINDER PAIR

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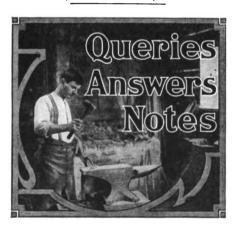
result of unskilled tampering with it.

To remove the radiator take off wooden hood blocks; disconnect water connections, top and bottom; disconnect from frame at either side, using socket wrench. Draw the radiator forward, being careful to note position of leather pads which hold radiator in proper position for accurately meshing pump gears.

Owing to the high speed at which the pump gears run it is essential that these gears mesh accurately, and for this reason great care should be exercised when removing the radiator to put it back in exactly the same position. Care must also be taken to see that the fly wheel cannot strike the pump gear.

If the pump leaks at the shaft the packing has probably become worn. To replace packing, disconnect radiator from chassis; remove pump cover-plate; disconnect pump fan; unscrew packing nut (gland) using socket wrench, seize gear and draw shaft out—if tight drive gently with wood block. To replace, take 1 x 3/2 hemp packing six inches long. Insert pump shaft; wind packing round shaft and force packing down, using some blunt tool to force packing to place. Screw packing nut down tight, replace cover plate. Before replacing radiator on car, fill with water to see that packing does not leak.

(To be continued.)



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

About December.—The December American Blacksmith is a gem, best of all; permit me to congratulate you.

J. L. H. Mosier, New York.

A Question on Boiler Tube Work.—I want to ask for some information on welding boiler tubes. What tools are used? Will some brother help me with some pointers on this? C. J. Pedersen, South Dakota.

That Criticism.—In answer to Mr. H.'s criticism I want to say that I think he

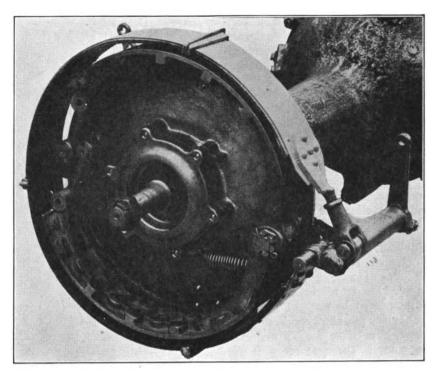


FIG. 5. BRAKE DRUM SHOWING BOTH INTERNAL AND EXTERNAL BRAKES

is way off. I like the advertisements, for if there is a new machine we find out about it. I don't think that there is too much of anything.

ALEX MOORE, Kansas.

On Tempering and Welding.—Please give us information on the following through "Our Journal": How to temper automobile springs, and also how to weld flues and what kind of tools to use to make a good job. Borstad Bros., North Dakota.

A Jig Saw Question.—I am making a jig saw for cutting brackets and would like some advice on how to rig the spring at the top to hold my saw tight. It has to be so fixed that I can put the saw through a piece to saw inside work. Would like to have somebody give me advice on this soon. J. W. Summs, North Carolina.

He is Well Pleased.—In reply to Mr. R. E. H., of Tennessee, I think "Our Journal" is all right. Just keep up the good paper as it is. Sometimes there is more of one thing than another, but I find it all O. K. as it is. I think he will find some time that he will wish there had been more about auto repairing than there is, unless he is not prepared to do machine work at all.

E. B. Newall, Illinois.

Learning the Trade.—I would say to Charles T. Rodgers, of Tennessee, who wants to learn to shoe horses; by all means work with some good shoer, but be sure that you find a good one first. What will bother you is that we all think we are the best. Another thing I would say is that if you do not like a horse or haven't any horse sense and sympathy with the animal you had better not try to learn the shoeing trade.

John Weber, New York.

A Question on Axle Setting.—I would like some brother smith to explain why a wagon thimble cannot be set the same as a steel axle. I have a setter, or gauge, that I set the bottom and the front to, but I pay no attention to the different patterns. When I put the wheel on it will set on a plumb spoke and will be just

one half the width of the tire wider behind than in front. So why won't it work the same in a wagon? Can someone tell me? C. L. HIGGINBOTHAM, Missouri.

Wants to Build an Auto.—I have been thinking of building a motor wagon to carry 4,000 pounds or more. I would like to hear from some of our readers on the subject in regard to the kind of engine and size that would be best suited to such a wagon; also a few hints on general construction of same. As it is not for speed, how would solid-tired wheels do? Also whether chain or friction drive would be most effective? Any further information on above subject will be gratefully received. W. D. DALGLEISH, California.

A Suggestion.—I would like to suggest that at some future date you publish cuts of the tools and machinery used in the manufacture of plow shares in large factories. I have examined numbers of shares and find marks of some tool that could not be used in small shops or that small shops have not got. Jas. Wallace, Sask.

EDITOR'S NOTE:—Perhaps some one of our readers who has had experience in a plow works can give Mr. Wallace the information he desires.

Power in the Shop.—I don't want to miss "Our Journal." I would not do without one copy for \$1.00; I think that much of it. I would say in regard to power—I don't see how a man can get along without it. To parties putting in power, first consider what kind of power machines pay best and what are most needed. Then buy power machines to suit the work. There is not a machine advertised in The American Blacksmith that won't pay for itself in one year's time where it is needed and used.

R. Lowrey, Oklahoma.

Who Knows How?—I have a question to ask the readers of The American Blacksmith. I will be very thankful if they can help me. I have a 36-inch pulley to

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remove from the shaft. It has a wood rim with iron hub and spokes. I have taken out the set screws and have filled the holes with kerosene oil and let it soak through. I have also heated bands and put them on the hub and have tried to drive it with a hammer, but all to no avail. Who knows how this pulley can be removed?

G. W. H., New Hampshire.



AN EMPIRE STATE SHOP

Two Simple Treatments.—I will answer Brother Henry Nelson, New York, in regard to shoeing the horse. I have three horses here that were the same as the one Mr. Nelson describes in the November number. I have cured all three of them now and their feet are as sound as any horse's feet. I used rubber pads. It took six months to cure two and nine months for the other one. The two first were seven and eight years old and the third was sixteen years old. A simple method to cure a corn in a horse's foot is to pare the corn as much as possible. Then fill in where the corn was with brown sugar, heat an iron and then melt the sugar and your horse will go as if he never had a J. S. SHULTZ, Iowa. corn.

A Question for Vehicle Men.-I would like to ask one small question: Suppose, for instance, you get an axle to set, or rather to reset, where one wheel has got about three inches dish, and the other three fourths of an inch dish. How are you going to get your four wheels to track properly? I should be very pleased if any brother smith would inform me the right way without having to break one wheel and rebuild it to correspond with the others. Don't think I am asking a silly question. I had a job like that here just recently and the man insisted upon saying that it could be done without breaking one wheel. But he could not explain to me openly how it is done. I, myself, say it cannot be done and I have had some twenty-three years' experience in coach and carriage smith-ROBERT GREEN, South Africa.

Automobile Section Instructive.—I appreciate your efforts to please us all. In my own particular business, what do I care for the articles on repairing locomotive frames? That is out of my line of business entirely. My business is to shoe horses, repair wagons, buggies, farm machinery and occasionally an automobile. Those are the particular lines I am interested in.

I like the articles on automobiles. They are good and instructive. I would be pleased to see an article on the Buick two-cylinder, five-passenger cars. The gasoline engine articles are fine. They have helped me to become master of my engine and I don't need to call on anyone to help me out. When it don't work, I know what is the trouble and how to fix it. Let all the articles come and what don't interest me will interest some one else. I like The American Blacksmith, "Our Journal."

Better than All Others.—In reading the December number I came to R. E. H.'s letter and, to say the least, I am surprised. It is well understood that a magazine cannot exist on the subscriptions alone. And if anyone can find more or better reading advertising-matter than is to be found in "Our Journal" I would like to see it. Our friend will find that he can't begin to absorb all there is in "Our Journal' on such work as he mentions, letting alone the auto repairing and such like. I find more real good reading in the journal than all the other papers and journals that I get. The only fault I have to find with "Our Paper" is that it doesn't come often enough.

The best way to learn to shoe horses is to work under some good horseshoer who has the reputation of being the best in his city. And study the horse by getting some good book on the subject. Also read "Our Journal," and you can't miss it. I'm not much of a scribe, but I couldn't keep still when I read the letter of R. E. H. Hoping he will soon change his mind and write a different letter, I am an A. B. subscriber. E. J. Bennett, Wisconsin.

Restoring Dry Cells.—I would like to ask through your valuable columns if there is any way to restore dry cells that are run down. I have plenty of batteries, but they do not last very long. Can you help me?

Andrew Coba, Nebraska.

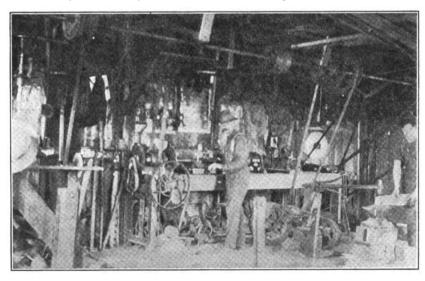
In Reply.—Remove the cells from the pasteboard holder and with a punch, or wire nail, punch holes in the zinc cover, going well down into the compound. Six holes in each cell will be sufficient, keeping all of the holes above the center of the dry cell. Then prepare a strong solution of

sal-ammoniac and water, or common table salt and water (the latter, however, is not as good as the first-mentioned solution). Now place the perforated dry cell in a suitable vessel and pour the solution upon it, seeing that the cell is well covered with the liquid, and allow it to stand for eight or ten hours, after which time the holes in the zinc covering may be sealed with sealing wax or paraffin and the cell will be practically as good as new, although it will run down more rapidly. Dry cells may be renewed in this manner two or three times, although after each renewal they run down more rapidly. B., New York.

A Power Shop of York State.-I would as soon try to run my shop without an engine as to run it without THE AMERICAN BLACKSMITH, as both are indispensable to the craftsman of today. I run a general shop and do anything that comes along, horseshoeing, general repairing, woodwork, and machinery and automobile repairing. My outfit consists of a five-horsepower gasoline engine, a twelve-foot iron lathe, a trip hammer, an emery stone, a saw gummer, a hand and power drill, a heavy steel punch, a steel shear, a rip saw, a planer, a 26-inch band saw, a boring machine, a twelve-foot wood lathe with attachment for making sleigh pins, a circular saw for cutting wood and I also run a twelve-barrel cider mill. We also have a very complete outfit of hand tools for both wood and iron work. We have plenty of work the year around, but prices are not what they might be if we would stick closer together.

The accompanying photograph shows a view of one corner of my shop with myself at the lathe and my blacksmith at the hammer. The exterior view shows myself and family in foreground with auto. The car shown is a twenty-four horse-power Rambler which ran away with me and brought up with a sudden stop against the house, breaking nothing but the radiator and fenders. F. L. Rowe, New York.

On Axles and Shoeing.—I have been a reader of The American Blacksmith for about two years and greatly enjoy its contents. I think the paper is a great teacher to our trade. It is very amusing to me, the great difference of opinions on



POWER CORNER OF MR. ROWE'S YORK STATE SHOP

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different things. Take for instance, the axle problem. Some say the front axle should be the longest and Mr. Gunn, of Virginia, tries to teach us to make the hind axle the longest. It seems to me with the hubs the same length that the axles are the same in length. If you make your spoke plumb it does not matter whether your wheel is three feet high in front and thirty-three feet behind, the axle would be the same length, but be sure and have your spoke plumb. In regard to the pitched ankle, I agree with Brother Chambers; do not raise the toe and lower the heel. Just try the opposite and raise the heel and make the toe short. Try it for yourself. Raise your heel up and see if your ankle does not go back. Now raise your toe and see if the ankle doesn't go forward. It works the same on a horse as it does on a man.

I am no kicker. Put in our paper what you want. It is all interesting to me. I read every bit of it from autos to horseshoeing. Frank McMichael, Pennsylvania.

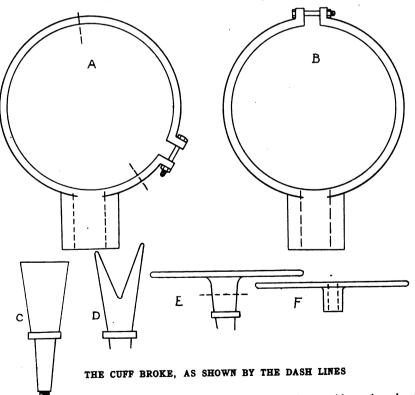
A Letter from Missouri.—I have been reading "Our Journal" this evening and as I had not written anything to the craft I will say with Mr. W. Chambers that Mr. Shreves would do well to get Professor Rich's book if he aims to keep up to date. I will also say that I know from experience that a horse can be stopped from interfering. I have yet to find my first horse that I cannot cure. I had one this fall that was the worst I had ever seen and, of course, the driver didn't think that the horse could be stopped. The horse

Four new shoes plain or toed	\$1.25
Resetting, old shoe	. 20
Two-horse wagon axles front or hind	2.50
Bolster front or hind	1.25
Hounds, back, using old irons	1.50
Spoking wheels	2.50
Rimn ing	2.00
Wagon tongue	2.00
Tongue circle	1.50
Welding brace irons	.35
Stubs, one inch and under, per set	6.00
Neckyoke	.75
T 1	

I have not been here long, but it seems as though I will have a good trade here. I sent and got a cut of the horse's head and had some letter heads printed and every one that sees them says they are very good.

IRA BOYNTON, Missouri.

A Case of Ankle Hitting.—A Mr. Ray drove up to my shop about twelve months ago and said, "Hello, Daddy! I want you to look at the shoes on this mare and see if you can make some just like them. If you can I want you to fix her up for me.' I looked at the shoes and said, "You have a fine mare, but I see she hits her ankles.' "Yes, she is a goer, but knocks her ankles; her feet are too long on the inside. I want her feet trimmed on the inside and shod close. I have paid out \$50.00 on her feet already." I said, "You have dictated the shoeing of this mare because there is no experienced smith who would shoe this mare as she is now shod, unless it would be to please a customer who had his own ideas. Now, stand the mare on the level floor and you will see how much her ankles stand inward. If I trim the inside of the foot, her ankle joint will lean still more inward.



was blind and, of course, could not tell anything about where she was going, and that made it worse. I stopped one that several smiths had experimented on for two years, and I have stopped the worst cases of forging that I have ever seen. I will give you a few of my prices:

If I cut down the outside and make the outside shorter than the inside, when the mare puts her weight on that foot her ankle joint will be out of the way of the other foot and will pass without hitting. If I shoe your mare the way you want her shoe will hit and I must bear the blame. If I shoe your mare, I will shoe her my way. If you want her to hit trim the inside of her

foot and make her hit; but if you want her to miss I will trim the outside of the foot, then her foot will pass and not hit.' Mr. Ray said, "Go ahead and shoe her.' I did shoe the mare and have every time since and she goes clear. A. R. Pace, Tennessee.

Making an Eccentric Cuff.-The accompanying illustration shows the cuff of an eccentric that broke as shown by the dotted lines. A in the engraving shows the old one and B is the way I made the new one. I took an old buggy stub and spread it out until it was as wide as I wanted it as at C. Then I split it as at D and then bent the split ends as at E, and cut it off at the dotted line. I then drilled the piece as at F and tapered it out. Then I threaded a 3-inch rod and screwed it into the piece to hold its shape while bending it as at B. The job was completed and my man was well pleased. A. T. WRIGHT, Texas.

Eye Bolt Machine—To Temper Anvil.—I would like to get information about a tool or machine to put on the anvil for making eye bolts. I also want to know how to temper or how to harden an anvil.

J. Brayley, Ontario.

In Reply.—To temper an anvil, will say, first fit two porterbars to the square holes in the waist of the anvil to lift it with and bend the fitted ends at a point six inches from the end. Put a bushel or so of coal on the fire and char it. Do this if you have no coke. Now get a tub or barrel large enough to let the anvil in face down while it is being hardened and fill it within three inches of the top with clean water. Put anvil in the fire face down and heat it very slowly, moving it forward and back until red hot. Then take it out of the fire and sprinkle on the face a mixture of equal parts of table salt and chloride of potash. While this is being done have your fire fixed over and have a good body of fire over the tuyere iron. Then return the anvil to the fire and bring the heat up slowly and evenly the whole length of the face to a cherry red. Then lift anvil and quickly brush the face with an old broom, and put it in the tub. Let it hang by the porterbars, resting on the edges of the tub or barrel. Take your forge shovel and stir the water gently about the face while the helper pours cold water into the tub at the sides of the anvil, the hot water passing out through two pieces of pipe into the pails on the floor. When cool, remove the anvil from the water and brighten the face with an emery brick or a piece of emery cloth.

A Few Lines from the Palmetto State.—
I will try to write a little to let my brother apprentices know that we are not asleep down here. I have only been a reader of The American Blacksmith for nine months. It has already been worth five times the price of subscription to me. I don't see how I could do without it now.

I am a young blacksmith, only nineteen years of age. I have worked at the trade for about a year. I put up a small shop and began to work with but little experience or practice, and I am thankful to say with the help of The American Blacksmith I have been successful. I believe in starting at the ground to climb the tree. I enjoy reading our brother apprentices' letters very much. I hope to see more about forge

work, welding, brazing, tempering, gunsmithing, etc.

I would like to have some gunsmith advise me how to repair a gun that has been worn and become badly loosened in the breech. All parts of the breech seem to be worn about the same. Would like to have information how to repair it and make a first-class job without having to put on a new breech. I have my idea about repairing it, but I want more information from an experienced gunsmith.

Prices of work are quite low to what they are in other places. As I have not had much experience in blacksmithing I will not try to give any advice on how to work. I hope to see a lot of talk on wheelwright and axle setting, as I have a lot of that to do.

There are five shops in this neighborhood within hearing distance from each other. I am the youngest blacksmith of the five and I think it would pay me to locate somewhere else. I am thinking of moving into a settlement where there are no other blacksmiths within six miles. Do you think it will pay me?

SAMMIE G. GOFF, South Carolina.

Learning the Trade.—In reply to Mr. Charles T. Rodger's inquiry in the Journal, will try to advise him the best I know how. First, do not attempt to start in business for yourself until you are (at least to a certain extent) master of the art. There are thousands of cross-road blacksmiths in this country shoeing horses. They have never served an apprenticeship and have never studied the nature of the horse's foot and its actions. They work for low prices, get the lower class of trade and they go at the work like fighting snakes. They are not horseshoers, but horse butch-Observe some of them, note the condition of their shops and how they live and conduct themselves after working hours and on Sunday. Note the condition of their homes and then go to a good horseshoeing shop that is doing business right. You will find the boss a oractical business man who has served his apprenticeship and worked long years as a journeyman. I worked twelve years as a journeyman before I was capable of running the business successfully. I have worked in several different towns and cities, am now but thirty-two years of age, and have an answer on the end of my tongue for nearly every question that may come up in regard to the trade. But, remember, I haven't learned it all yet.

If you can afford it, go to school by all means. Then work as a journeyman in several of the best shops in the country, and save your money and watch for an opportunity to start in business for yourself. Start in the right place at the right time. I am always very much interested in any young man who has struck upon the idea of getting started right. I should be pleased to hear from Mr. Rodgers and shall be more than pleased to answer any question he may wish to ask in regard to the trade.

C. C. RICHTER, Missouri.

From Natal, South Africa.—I left Rhodesia after two years, because the climate did not agree with me and I trust I will stick out many years where I am now located since I own the property. Upon my return from Europe, where I had been to see my friends and people, I bought this

place from a smith who was sick. The change across the sea has done me much good and I think it will do the same to other hard-working brothers after years of toil. I think it pays one to take a rest every two or three years and to consider oneself a gentleman for a short time. The benefit of the change is not according to what amount of money one has to spend, but according to one's own desires.

Automobiles are rather out of the question where I am now. They are used more in the inhabited districts and towns. But I enjoy the lectures on auto repairing as well as any other articles in our valuable paper, because I like the change and the new ways and have to thank you for many hints. The number of automobiles will increase in South Africa, especially where horses and cattle have to do so much of the transporting.

Many things have been discussed in The American Blacksmith, but I have seen very little or nothing on pumps and wind mills, and water-wheel building, supply of water for farms and gardens from rivers or springs. This is a great question with the African farmer. The soil generally is not deep, and then there are the brooks that carry the water into the rivulets and this leaves no moisture to the surface ground. The waters of the rivers do not even wet the banks, except in its own bed.

I should like to hear from brother craftsmen as to a profitable way to drive a supply of water from a river about two hundred yards distant with fifty yards' rise. Imported windmills are running on big farms, but they are too expensive for small farmers to purchase. Perhaps a water wheel could be built like a turbine to be run with a force pump directly, or could a hydraulic ram be profitably built in an ordinary blacksmith shop?

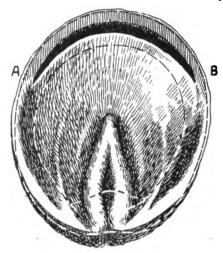
Otto Tietz, South Africa.

The Hollow Toe.—In reply to Henry Nelson's question in the November number would say; shoe the horse, with the shell parted at the toe, taking the bearing off the same by cutting the shell from A to B, in the engraving, and filling the cavity with a little tar and oakum to keep out the dirt. Put on a bar shoe, not allowing it to bear too heavily on the frog, especially if it is hard. Put on leather if it needs it, but don't pack too heavy if the bottom is tender. Of course, the hoof will have to grow down, you cannot grow it together. I have cured some very bad feet in this way.

A. E. BORDEN, Rhode Island.

An Interesting Letter from Wales.-I have for some time taken a keen interest in The American Blacksmith. I am no craftsman, but simply a timekeeper and clerk where about forty men are employed as carriage-builders and as shoeing and jobbing smiths. During the time I have been thus employed I have had ample time to study the ways and different characters of workmen and customers generally. I have noticed chiefly that each individual workman has a peculiarity of his own and you have to approach one man in a very different manner than you do another to enable you to get the most and best out of him. There is, however, one way I think that will at all times get men to do their best. That is, by leading and not driving. Then, again, by giving a word of praise

when praise is due. All men prefer to have enough work before them, knowing when one job is finished they have another in readiness. A system such as preparing tomorrow's work today I consider very effective, especially is this the case with smiths. They should know the previous evening what they intend doing first the following morning. When a job is not waiting they can fill their time making horseshoes or other articles which they



TAKE BEARING OFF AT THE TOE

know will be required. To those in a small business I would recommend the study of their customers and their requirements; in fact, this applies to all business. Strict attention should be given to accounts and rendered at regular intervals. When a customer demands an account, it should not be delayed or postponed, but rendered as promptly as possible. Nothing in my opinion causes more bad debts than the neglect of making accounts, and that at the right time. When accounts are rendered at regular intervals all customers then look forward for their bills and are in most instances prepared for them, as they are for rent-day or taxes.

With these remarks I wish to offer my congratulations on the merits of "Our Paper" and wish you all success in the future.

Welshman, North Wales.

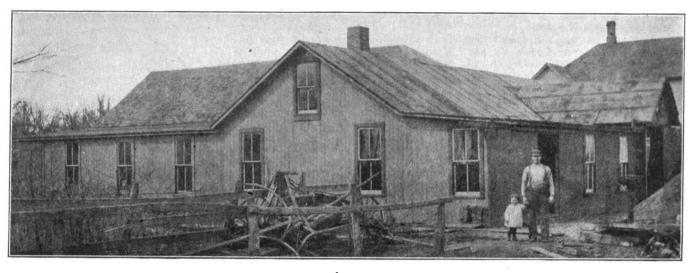
Power in Kansas.—I think there is no other publication like "Our Journal," anywhere near it. Every copy is worth the subscription price for a year. I have made quite a success of the business in this town but I think it is more than necessary that a smith, to make a success of his business, should take at least one good trade journal and as many more as he can afford. I started here by learning the trade in one of the shops and after three years of apprenticeship I opened a shop for myself and have been going along for myself ever since. I have taken THE AMERICAN BLACKSMITH ever since it started and am proud to say it has been a great help to me in my business. I was one of the first in this part of the State to put in power and I installed a Witte three-horse gasoline engine with which I run a grindstone and emery wheel. But it did not take me long to see the advantage of having power tools so I kept on buying as I could afford it until I now have the best equipped shop in this part of the State. I have a power drill; a ten-foot lathe; an emery wheel;

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a tenoning machine; a boring machine; a grindstone; a trip hammer; a disc sharpener; a blower and expect to add a power thread-cutting machine and also a band saw. I had to give up my engine as it proved to be too small. I put in a new five-horse electric motor which proves to be just the thing.

Our prices here are very good. We did

the other brother was. In round numbers I have averaged a clear gain of \$1,200 a year for thirteen years. There may be many that do better but there are a few that have not done so well. I leave the shop three or four days a year, but the rest of the time I am where the public wishes to use me and I treat every one with respect and always do the work the can. Again he says that he has often heard the expression when talking with a tool maker, "we keep a blacksmith and he is all right on forgings, but he doesn't understand steel." I would like to have him explain; that is a mystery to me. I always thought that a blacksmith had to understand anything before he was able



THE ILLINOIS SHOP OF A PROGRESSIVE GENERAL SMITH

have one fellow here who would cut the best I can. I get better prices than my price all to pieces and then lie to the rest of us about it, but we never paid any attention to him and at last he had to sell out and leave. But not before he paid an attachment suit on his car of furniture amounting to about four hundred dollars; so you can see how it goes with price cutters. My motto is "satisfaction to every customer." Let them kick all they want to on the price but not on the job. We aim to fix all that comes our way and find it pays to work a little over time on some jobs to please a customer or accommodate him, as he is more liable to think of you when he wants another job done.

W. R. Jones, Kansas.

An Illinois Shop.—The accompanying engraving shows my shop which I have finished recently and in which I have a concrete floor. I have been at this place about fourteen years. When I came here the shop was 20 by 40 with a partition through the middle and half of it used for a stable and the other half for a general shop. The smith could hardly make a living. Now one part of my shop is 29 by 51 and the other part is 31 by 32. Since I started here I have built a store at a cost of \$1,200, a house at a cost of \$1,200. and other buildings which I rent for \$20 a month. I also bought a little farm adjoining the shop comprising 38½ acres at a price of \$4,680; and I also bought one hundred and sixty acres in Minnesota at \$8,000. I also rent a small farm of sixty-eight acres at \$300. After husking the corn I find I have three thousand four hundred bushels and it is fifty-four cents a bushel. I have about one hundred head of hogs, ten horses and four cows, but I do not get one day out of the shop to work on the farm.

I just write this that you may judge whether or not I am busy and how busy

neighbor and I charge for what I do. I do not lose \$5.00 a year in shop accounts. I have read "Our Journal" over a year, and I must say that I think it a great H. H. ZIMMERLI. Illinois. educator.

A Few More Criticisms.—It seems as though some people cannot get along without criticising some man that is not condemning any theory at all. The article on page twenty-two of the October issue, written by C. N. C., of Nevada, in which he has expressed his opinion in regard to the man that learns his trade in a trade school. He has the proof to show that he is right and in what he says I judge him a man of good common sense.
Now "Old Timer" comes back at him

with such a revenge. He does not judge the institution as the failure of the men. The men have failed to do their part. I think that an institution ought to compel students to perform a certain amount of work with their studies before they turn them out ready for business. Now, "Old Timer'' says that the trade school familiarizes the apprentice with different kinds of work. I would like to ask what good it does to familiarize yourself if you don't do the work with your study. A man might read a lifetime and yet he would not be able to make a weld if he were to be hanged. Then he says, "How many men who learn their trade in forge shops can go into a job shop and shoe horses?" That is the first I ever heard of a job shop shoeing horses. He used to live in a country where the farmers all plug in together and have their horses shod by the hundred on cut basis; and, further, he says, "nor iron carriages, or go into a machine shop and temper steel and give satisfaction." Now if "Old Timer" will show one man who learned his trade in a general shop that can't temper steel properly I will show him ninety-nine that

Again, he says, "Why is it that some machine shops employ a machinist to do the tempering and send all their forgings to be done outside?"' The manager will say, "We haven't forgings enough to keep a man at work all the time and it is difficult to find a blacksmith who can work steel." This doesn't look reasonable to me. If a blacksmith doesn't understand steel, what business has he trying to work it for a machinist. If he doesn't heat it properly it is spoiled, so why doesn't the machinist do his own forging as well as the tempering?

Then he says, "Now what can we do to recover the work that belongs to us, but has been taken from us and given to another trade?" Learn your trade both in theory and practice and keep the trade at home. Don't think that I am condemning the trade school, for I am not. I think it is a mighty good thing, but we must practice with our hands to help our brain, and then we will accomplish something. I believe that good, common sense, with a good, practical knowledge, will preserve the honor of the craft as well as any trade school. I am an old timer myself; I commenced in the summer of 1881, twenty-seven years ago, and my first job was to weld a sickle bar, and I made a success of it. I never stopped and I can forge steel and I can temper it to give satisfaction. I never have taken any lessons either from any trade school. I always make it a practice to study my work before blundering headlong and not looking where I am going. I believe that is the best way to do. A man who can't see his own faults can't learn anything, but the man that sees his own faults generally learns something, even if it isn't much at once. If you keep a record of your mistakes for a year and then figure up you will find out that you have learned a whole lot. Did you ever think of it?

C. W. METCALF, Iowa.

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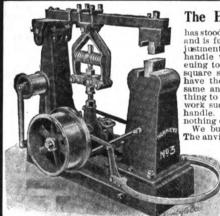
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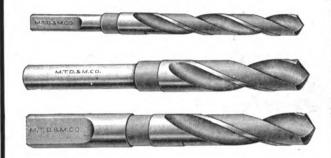
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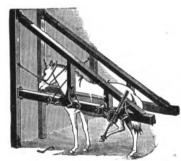
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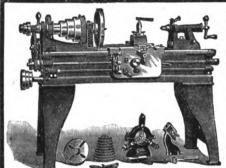
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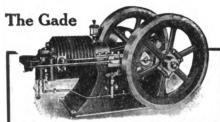
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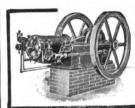
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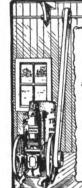
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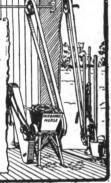
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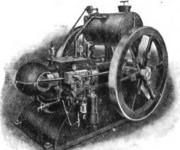
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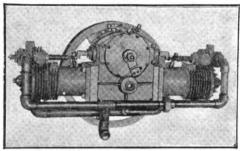


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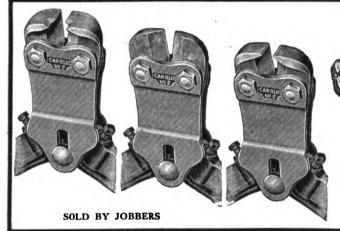
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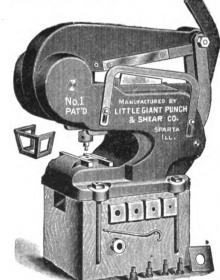
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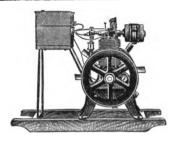
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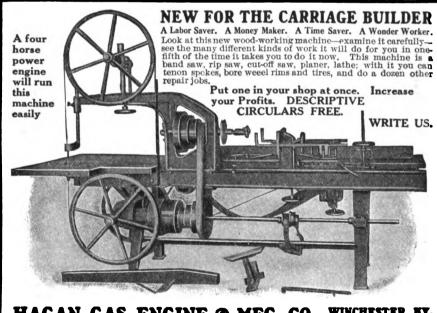


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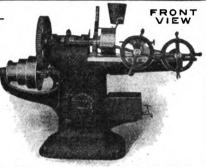
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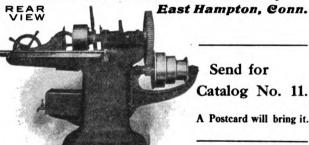
Best on Earth



A Bolt Cutter is Much Like a Man in This THE HEAD IS NEARLY EVERYTHING

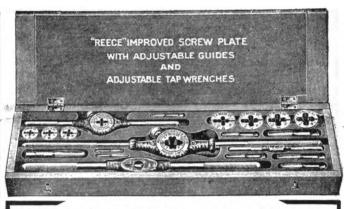
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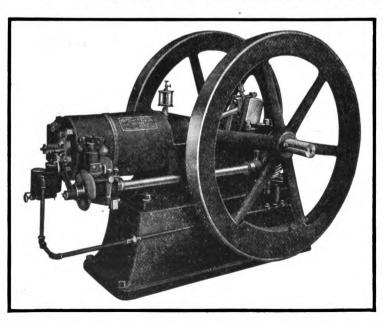
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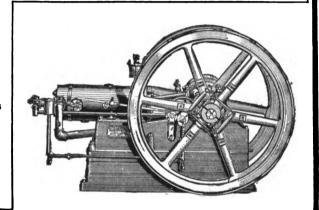
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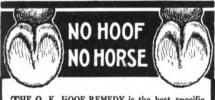
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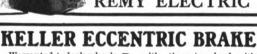




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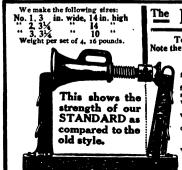
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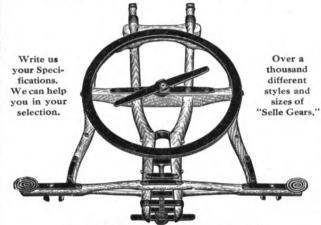
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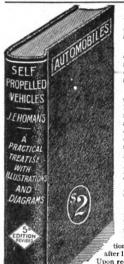
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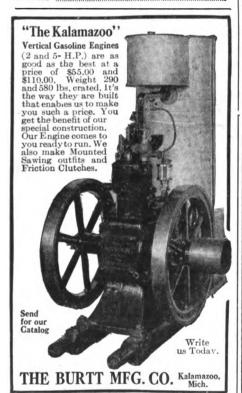
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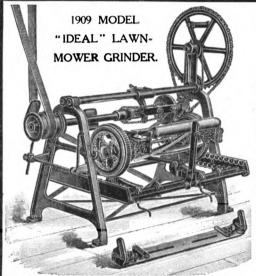
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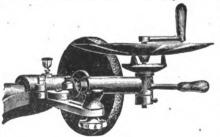
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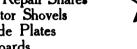
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Star Manufacturing Company,

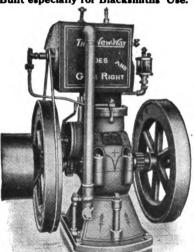
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Then look at an engine that IS simple
One-piece cylinder—no chance to leak—grows, stronger with use. Everything enclosed—no frail parts—no water—not a piece of packing or a gasket in it—no gasoline pump troubles. It absolutely cannot be overheated under full load—any temperature—any length of time. Your judgment tells you to

length of time. Y judgment tells you to

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- Draftsman

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 Course

Name		•••••
Address		
Occupation		•••••
	American Blacksmith 2009.	

Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, Feb. 4, 1909, and are subject to fluctuations. Corrected for The American Blacksmith by The National Heavy Hardware Reporter. Chicago.

Correspondents report no changes in prices	B.,
Horse Shoes-	
All Iron Shoes Steel Shoes No. 0 and No. 1 25c. extra. 15c. per keg	\$4.40 4.25
additional charged for packing more than one size in a keg	
Mule Shoes	4.90
Featherweight Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Ideal Countersunk.	6.00
Goodenough, heavy	6.00
Condenses the man of the condenses of th	6.50
Goodenough, sharp	
Toe Weight	7.00
Side Weight	9.25
Track Weight	9.50
E. E. Light Steel	5.50
E. E. Light Steel Steel Driving	5.50
O. O. Mule Shoes, extra	1.50
O. O. Mule Duoes, extra	1.50

Merchant Bar Ir		
\$1.90 to \$2.10	rates full extras	. and 20 cents per
100 pounds	extra for broken	bundles.

Per box.

Steel	Ba	rs-	_				
\$1	.90	to	\$ 2.10	rates,	full	extras.	

Toe Calks-

Sharp		· · · · · · · · · · · · · · · · · · ·	
Carriage E 6 x f an Larger	ioits— d smaller and longer	 	60– 10% 5 0%
Machine E	d smaller	 	60-10%

Larger and longer	50%
Nuts— Less than 10 lbs, of a From 10 to 50 lbs	size
Washers— Same price as nuts.	Skeins— Cast 65%

Maileables— Common \$.09	Half Patent Axles — 65%
Springs— Single Spring, each Springs, black and half	\$1.25 bright06

Hickory Lumber-Per Foot-	
1 to 21	5.09 }
Ash and Oak Lumber-Per Foot-	

\$.07½ 2½-308 3½-4

-	•		
Yellow Poplar Lumb	er—Per M.	Feet-	
		13 to 17	18 to 24
3 ″	\$65.00	\$65.00	\$75.00
2	65.00	68.00	80.00
***************************************	68.00	75.00	85.00
1 7€	72.00	80 OO	104.00

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x 5	61	ft												
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1 x 61	7	ft.								 	 			

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ror 4	Skeins																								2

For 4 Skeins	2.25
Rough Oak Bolsters— Short	\$.08 .09
Finished Oak Bolsters— 21 x 32 and under	\$.65 .70

inished Oak Bolsters— 21 x 31 and under	.70
Rough Oak Wagon Tongues—	\$ 1.00

3 x 4	.70
Rough Oak Wagon Tongues— 4 x 4 x 2 x 4 x 12 and smaller	\$ 1.00
Finished Oak Wagon Tongues—	\$1.25 1.30

Two Inch Sawed Hounds	Per Pair.
Tongues	\$.40
Front	45
Hind	
Patent Wheels-	
A.B. No.13 and under	40 %
B. No 13 and under.	30 %
All Grades No 17 to 33	35-5 %
A.B. No.13 and under. D. No. 13 and under. All Grades, No. 17 to 33 All Grades, No. 39 and Larger C. No. 13 and under.	20 %
C No 13 and under	35-5 %
C. No. 15 and under	
	l Oak Hubs-Set.
7x8x9\$1.10 10x14	
7 x 9 x 10 1.10 11 x 14	
8 x 9 x 10 1.35 11 x 15	4.00
8 x 10 x 11 1.50 11 x 16	4.50
9 x 10 x 12 1.70 12 x 16	5.00
	5.50
	6.25
11 x 13 x 14 3.65	
12 x 14 x 15 4.50	
Rough Sawed Felloes-	
1½ x 2 " \$1.55 2 x	21" 2.00
1 x 2 1" 1.75 24 x	2 4.75

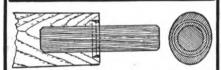
Konau Samen Lenoes-	
1½ x 2 " \$1.55 2	x 21" 2.00
1 x 24" 1.75 24	x 2 4.75
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	x 3 " 5.75
3 x 31" 6.0	
	U
Ironed Poles, White, XXX—	
1 x 2 1" No. 2	\$4.00
2 x 21" No. 3	
	2.00
Ironed Shafts, White, XXX-	
1 x 2 and smaller	\$2.15
1 x 2 "	2.35
1 x 2 1"	
• ' • ' ' ' '	2.00
Farm Wagon Bows—	
Round Top. 4 x 2 "	S . 65
Flat Top, x2"	
Round Top, x 21"	1.40
Canada da Diana Badia adda C	
Standard size Plano Bodies with S	
Each	\$4.25
Plow Beams—	
	e 70

\$.70 .85 1.00 All Hickory and Oak Spokes and Patent Spokes— Discount from Weis & Lesh List No. 5.. 5% Wagon Neck Yokes—

•	ag.	OH 1	100	K YOKES	Mixed	White
				Forest	Second Growth	Second Growth
	21	x 38	8"	\$2.15	\$2.95	\$4.25
	25	x 38	2"	2.90	4.05	5.50
	2	x 46	8"	4.40		
		x 4		4.70	6.95	8.90
	3	x 48	8"	5.50	7.85	10.50

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FOR WAGON MAKERS AND WHEEL REPAIRERS



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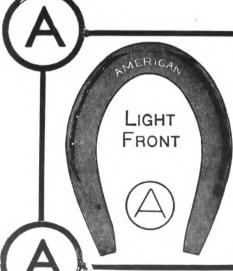
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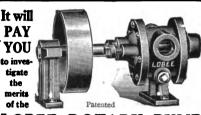
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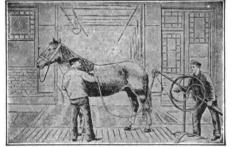
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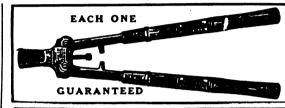
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Price List sent upon application.

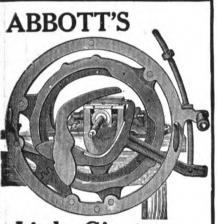




BCLT CLIPPERS

CHAMBERS BROS. CO.

N. Fifty-Second St., PHILADELPHIA, PA.



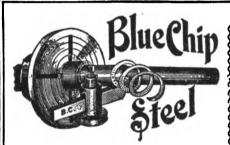
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Every Blacksmith and Shoer Should Have a Good Horse Clipping Machine

because there is big money in clipping horses and it usually comes when there is plenty of time to do it. Many blacksmiths make up in the hundreds of dollars every year from clipping, We have had blacksmiths who bought our highest priced Electric Clipping Machines, costing \$85, write us that in a single season they have taken in from the clipping four times the cost of the outfit.

Clipping Horses is Very Profitable

The Stewart No. 1 Ball Bearing Clipping Machine (Enclosed Type)

A new clipping machine, sturdy, compact, perfect in every detail of material and work-manship, and at a price within the reach of every blacksmith and shoer in the land. Weight boxed, 36 pounds.

Price, \$7.50 F. O. B. Chicago

By far the most perfect clipping machine ever made. It operates practically without friction or wear. Crank handle turns slowly, machine works rapidly. It's mere play to run it. Gearing is enclosed in a case, beyond the reach of dust and dirt, and runs in oil.

This is a wonderful little machine that robs even the smallest shop owner of all excuse

This is a wonderful little machine that robs even the smallest shop owner of all excuse for not keeping a good clipping machine.

Because of the large number of these machines sold, we are able to make a remarkably low price on them.

Everything entering into its construction is first-class. It has a solid tripod base, a strong upright, and the gears are all cut from solid steel and made file hard. It is fitted with six feet of our latest easy-running flexible shaft and the same Stewart one-nut tension knife and handle that we use on our highest priced machines. In fact so perfect is its construction that we guarantee the driving mechanism for 25 years. It is the clipping machine of the future.



Stewart No. 1 Enclosed Type Horse Clipping Machine at Work.

Stewart No. 1 Ball Bearing. Enclosed Type, HorseClipping Machine. Price complete, as shown above, \$7.50.

"1902 Chicago" Horse Clipping Machine

(Cut Gear, Stewart Patent)

For blacksmiths who do a great amount of clipping we recommend this machine. It has brought joy to thousands. It is a very widely used clipping machine. All gearing is cut from solid metal. Teeth are milled in the large drive wheel and engage with hardened steel pinion. Knives are Stewart one-nut, dust-proof, balance-pressure type. Bearing of knives is absolutely perfect—tension always perfectly balanced and even. No clogging possible.

Power is Direct and Positive

Every bit is utilized. No belts to slip and waste it. No retarded motion.

The crank wheel is large and machined all over. There's a balance wheel on the pinion shaft which absorbs the jar and imparts uniform motion.

Working parts and flexible shaft are carried on a solid, substantial iron stand.

The machine is marvelously light running. A small boy can run it all day without tiring, using either hand. Net weight, 56 pounds. Weight, boxed, 70 pounds.

Price only \$10.75

The price of the machine makes its acquisition easy for any blacksmith. The annual output of this machine is so large New Chicago 1902 that we are able to sell it at a price beyond competition, and yet maintain its high quality.

Stewart Patent Horse We recommend this machine especially to those having a large number of horses to clip because it is the simplest, Clipping Machine. strongest and the most durable of all clipping machines.



Stewart Electric Clipping Machines

We strongly advise these clipping machines for blacksmith use because they are so convenient. A bracket goes with each one to hang it up and all you need do is to screw the attachment on any ordinary electric lamp socket, turn on the current and away she goes. They clip very fast, are noiseless and do not require the assistance of anyone. The man who runs the knife attends to the whole job.

Notice that we have two for Direct Current and one for Alternating Current

Notice that we have two for Direct Current and one for Alternating Current

Do not order an electric machine until you find out from your electric light company
whether they furnish you with direct or alternating current. If they supply you with
direct current the alternating current machine will not work on it. In other words
you must order the same kind of clipper as the current they will supply you. When
you order state the number of volts in your current and if alternating state number of
alternations. Your electric light company will give you this information.

Stewart Electric Clipping Machines will give better service than any other type of
clipper wherever current is accessible. The flexible shaft on Stewart Electric Clippers
is 6½ feet long and connects directly with the armature shaft of the motor, an arrangement which eliminates short bends in the former near the point of connection and gives
it the utmost freedom of motion. The motors are perfectly made and self oiling.
Connection is made by unscrewing incandescent lamp globe and screwing in a socket
already connected to switch and motor by an extra long flexible cord conductor, which
is a part of each outfit. Anyone can make this connection.

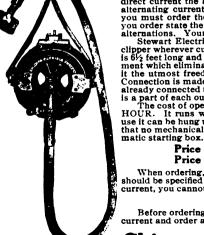
The cost of operating a Stewart Electric Clipper IS ABOUT ONE CENT PER
HOUR. It runs without noise. Can be started or stopped instantly. When not in
use it can be hung up out of the way. The machine and its equipment are so simple
that no mechanical knowledge is required for its installation or operation. Each direct current machine has an automatic starting box.

Price of electric machine complete for 110 volts direct current (Cut B) \$40.00 Price of machine complete for 220 volts direct current (Cut B) . . . \$60.00 When ordering, voltage should be specified if direct current is desired, and both voltage and number of alternations should be specified if alternating current is desired. If your electric light company supply you with an alternating current, you cannot use either of the above machines. You will require the alternating current machine.

Price of electric machine complete for alternating current, \$85.00

Before ordering an electric machine find out from the electric company whether they supply direct or alternating current and order accordingly. Order the machine you need NOW, either from your supply house or direct from us.

Chicago Flexible Shaft Co., 186 Ontario St., Chicago



Cut B.

YOUR HANDS

the only tools needed for adjusting and working idie stock on any diameter for which it is made.



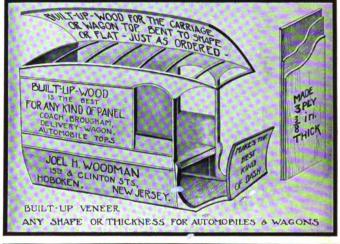
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It has a wide adjustment, too, and a range adapting it to a large amount of work. Put up in a case with taps.

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The No. 200 hand blower I bought from the Barlow Hardware Co. recently works fine. I have a little girl six years old that can run it with ease.

Yours,

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have you heard about the new tire setter called

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Blacksmiths are just wild about it where it is used, and the manufacturers are either crazy or dead sure they have a "cinch" on the other fellows for they actually warrant it to be better than any other and will let you be the judge.

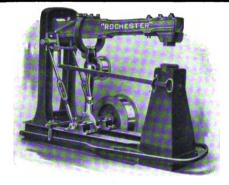
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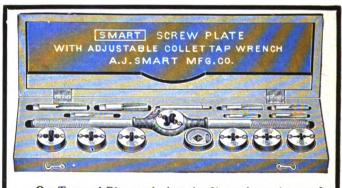
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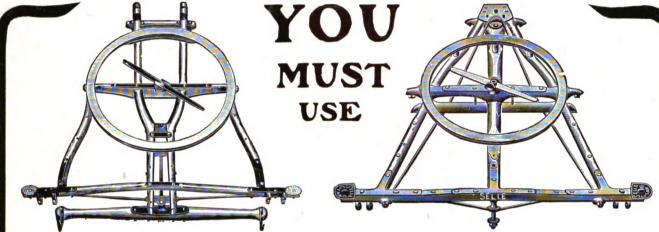
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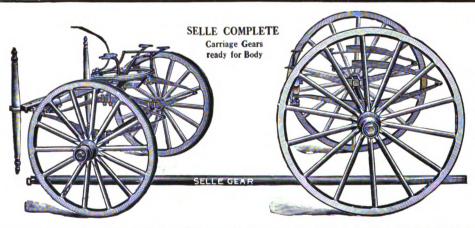
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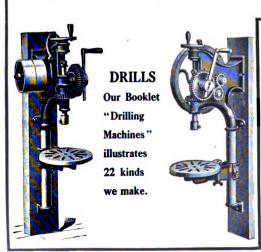
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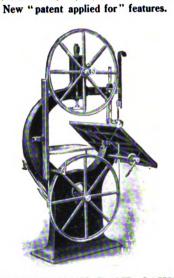
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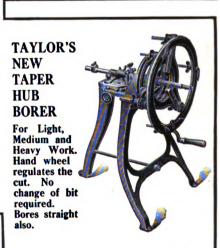


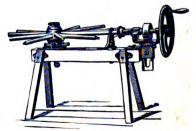
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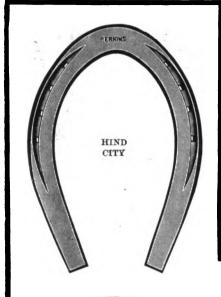
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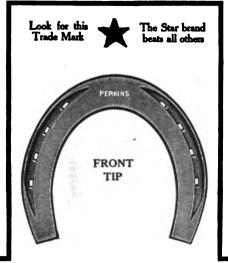


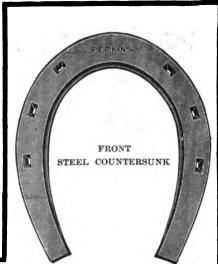


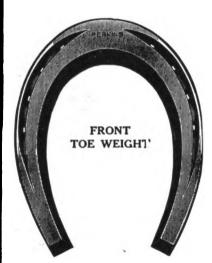
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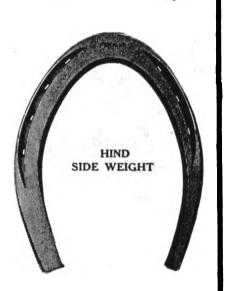






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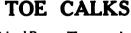
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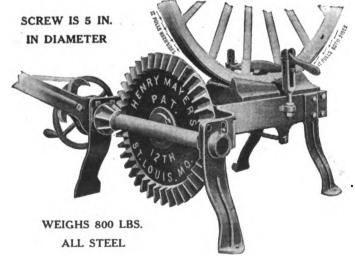
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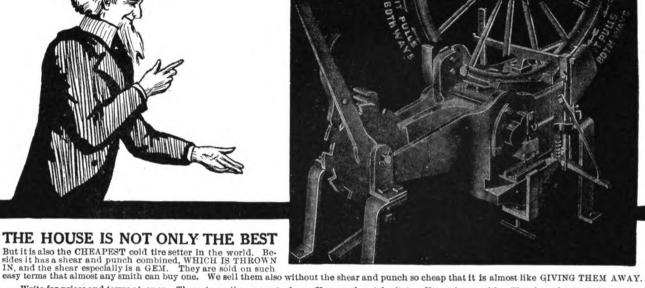
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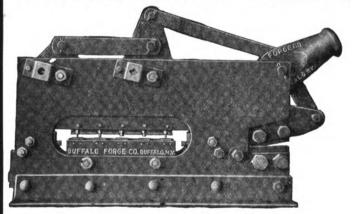
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These machines are guaranteed to have a greater capacity, less weight, and to be more durable than any other hand-power machine.

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Every Blacksmith and Shoer Should Have a Good Horse Clipping Machine

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> Clipping Horses is Very Profitable The Stewart No. 1 Ball Bearing Clipping Machine (Enclosed Type)

> A new clipping machine, sturdy, compact, perfect in every detail of material and work-manship, and at a price within the reach of every blacksmith and shoer in the land. Weight boxed, 36 pounds.

Price, \$7.50 F. O. B. Chicago

By far the most perfect clipping machine ever made. It operates practically without friction or wear. Crank handle turns slowly, machine works rapidly. It's mere play to run it. Gearing is enclosed in a case, beyond the reach of dust and dirt, and runs in oil.

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(Cut Gear, Stewart Patent)

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Power is Direct and Positive

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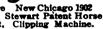
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The machine is marvelously light running. A small boy can run it all day without tiring, using either hand. Net weight, 56 pounds. Weight, boxed, 70 pounds.

Price only \$10.75

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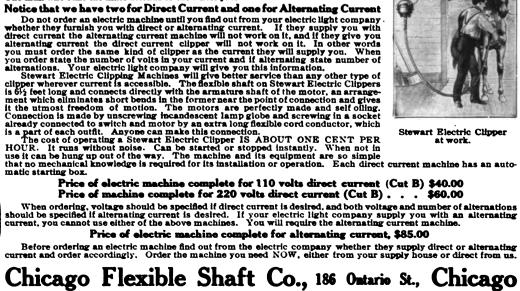
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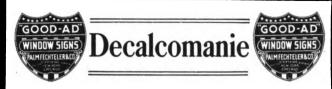
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NEW MODEL 1909 LOW-PRICED KERRIHARD POWER HAMMER

No hammer has so many fine points of superiority as this latest \$60.00 Kerrihard Hammer. Everybody can afford it.

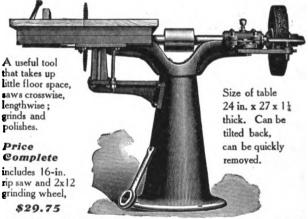
This latest achievement in low-priced power hammer saves you \$50.00 on first

Doubles your profits with one tenth the physical exertion.

No other like it at \$60.00.

FULL PARTICULARS ON REQUEST

COMBINATION BLACKSMITH'S GRINDER AND SAWING TABLE



No other like it at \$29.75 Complete as shown Clip the coupon and mail us with remittance. Complete machine will be sent you. Address

Hammer and Grinder Dep't of

Send the Continued it not nortering AR SEE: Enclosed Deservined and Vourstrain, but the company to me. The Kerrihard Company

Red Oak, Iowa

Dear, See: Endosed Piezee find \$20,75.

WE MAKE and Sell

direct to Vehicle Dealers, Blacksmiths and Wheelwrights

POLES, SHAFTS, WHEELS, SEATS, BODIES, GEARS,



and similar vehicle material. As we are manufacturers, not jobbers, we can sell you the goods at a lower price—in any stage of construction—when you want them. PROMPT SHIPMENTS is a feature with us.

SEND FOR PARRY ACCESSORY CATALOG.

PARRY MFG. COMPANY, Indianapolis, Ind.

Here it is!

Just what you have been looking for

PHOENIX BULL DOG TOE CALK



NEVER LETS GO EASY TO DRIVE CAN NOT TWIST
WELDS PERFECTLY

Can not drop off in the fire

Will not split the shoe

You Know the Phoenix Quality

Order from your dealer

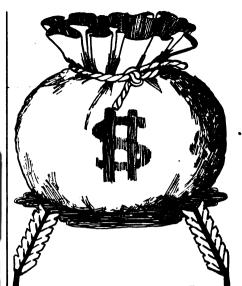
Will send samples on request

Phoenix Horse Shoe Co.

Largest Manufacturers of Horse and Mule Shoes in the World

CHICAGO, ILL.

Rolling Mills and Factory, Joliet, Ill., and Poughkeepsie, N. Y.



THE HUMANE Cushion Heel Shoes

will put dollars in your pocket because they are a trade winner.

They cost less money, are more durable and have more spring than any cushion shoes on the market.

They will positively prevent a horse from getting sore and will relieve all soreness caused by concussion and jar.

For sale by all leading dealers.

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Bauer Gasoline Engines



The Acme of Simplicity and Perfection.

It you will examine and compare, piece by piece, you will say there is no other quite so good as the "BAUER." All sizes from 2 to 50 H. P. Write at once for free catalog, containing long list of letters from satisfied users. Our prices are also very interesting, considering quality. The First Blacksmith in any town who buys of us gets the agency for his locality, a discount on his purchase, and a commission on his sales. A good engine sells readily.

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BOLSTER SPRINGS.



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Build a GASOLINE MOTOR or Motor-Cycle



We supply the rough castings and drawings or finished motors. A complete line from 11/4 to 10 h.p. for Bieyele, Auto, Marine or Stationary.

Send stamp for particulars.

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THE AMERICAN

forms any calk on a horse shoe that a horseshoer can make with a hammer. Just heat the shoe and one pull of the lever forms the calk.



American Calking Machine Co.

First National Bank Building, Chicago.

Factory, Perry, Iowa



HOT FORGED DRILLS



By our process of hot forging we produce the strongest and best drills the world has ever known. If your dealer does not keep "Netv Process Drills" in stock please write us direct. PROCESS TWIST DRILL COMPANY, Taunton, Mass., U. S. A.

CASE HARDENING MATERIALS

A Carbonizer which is positive, accurate, uniform and speedy is the

"BLAICH MODERN CARBONIZER"

For particulars address

ALFRED O. BLAICH, Manufacturer

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"MARVEL" ELECTRIC BLOWERS

"ONE FIRE" Marvel. \$28.00 For 4 Light Fires. 55.00 60.00 For 4 Medium Heavy Fires, For 4 Heavy Fires, -80.00 120.00 For 8 Heavy Fires,

Ask your Dealer, the Electric Light Co., or write to

ELECTRIC BLOWER CO.,

BOSTON, MASS. 352 Atlantic Avenue,

THE AMERICAN BENDING MACHINE

"The machine you have been looking for."

3 by %.

Work up to

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26



Sold under positive guarantee to do satisfactory work.

Manufactured by The Commercial Míg. Co. CLEVELAND, OHIO

HOT FORGED NIB MINES PERFECTLA STANDARD NO. 2 SHARP WELDS EASILY

INSIST ON

"Standard" Calks

BUY **FROM** YOUR **DEALER**

FRANKLIN STEEL WORKS

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POLES AND SHAFTS

THE QUALITY MAKE

Recognized as best by experienced vehicle men everywhere.

MADE BY

The Pioneer Pole & Shaft Co.

Headquarters and Sales Offices,

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Manufacturers of all styles and sizes of poles and shafts. A complete line that will SUPPLY EVERY REQUIREMENT. Have you our catalog and price list? If not, we want to send you both.



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FOR SALE BY THE LEADING DEALERS ALL OVER THE UNITED STATES.

AGENTS FOR THE MANUFACTURERS

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SOME IMPROVEMENTS FURNISHED ON

Western Chief



Royal Blower

Western Chief DRILLS

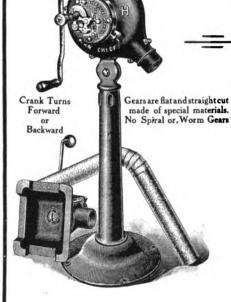
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THE BALL BEARING

A Single Steel Ball resting on a hardened Steel Disc. This contact of Ball and Disc forms a bearing in which the friction is too little to estimate. : : : :

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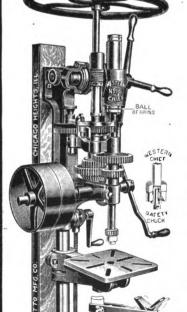








Operates by Hand



THE SAFETY CHUCK

It is opened and closed with the hand.

No more set screws to mar and bruise the shanks of bits. No more wrenches to tighten and loosen set screws.

No more twisting of bits in the chuck.

No more trouble in inserting and removing bits from chuck.

Forges-Blowers Drills

No. 16

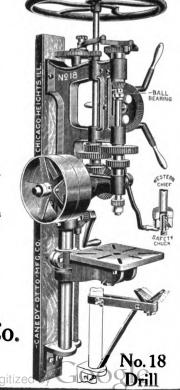
Drill

100 SIZES and STYLES to select from

Forges Blowers Drills

Canedy-Otto Manufacturing Co.

Chicago Heights, Ill.







Nail

Horseshoers Find Their Work Easier

WHEN USING THE CELEBRATED

The Easiest Driving Horse Valls Made from the finest material by the most up-to-date scientific method

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"Capewell" Nails

This nail is possessed of the most excellent qualities and so can be driven with ease into the hardest and most brittle

hoof.

"CAPEWELL" HORSESHOE NAILS

are practically and economically best suited to the needs of the horseshoers of the U.S. and of the world **Plate**



Head

Head

Regular

The Capewell Horse Nail Co.

HARTFORD, CONN., U. S. A.

PORTLAND, ORE. BALTIMORE NEW YORK **BUFF ALO** CHICAGO DETROIT MEXICO CITY, MEXICO PHILADELPHIA DENVER CINCINNATI TORONTO, CANADA BOSTON SAN FRANCISCO NEW ORLEANS YOKOHAMA, JAPAN

THE LARGEST MANUFACTURERS OF HORSESHOE NAILS IN THE WORLD

Corrugated



Nail



The Ohio Nut & Bolt Co.

BEREA. OHIO

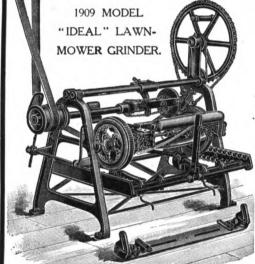
Manufacture and Sell-

BOLTS

Carriage, Machine, Tire, Stove, and Rivets and Rods.

SEND FOR PRICES.





"You Grind it as You Find it."

The 1909 Model of THE "IDEAL"

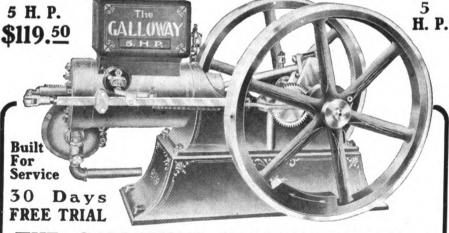
Lawn-Mower Grinder

grinds the Reel Knives to fit the straight biade even though the latter may be bent—something never done before and the most important feature of lawn-mower sharpening. Has 5 in, ball-bearing grinding wheel, babbitted bearings, twice as easy running as any other. Grinds either right or left hand Mowers perfectly in 15 minutes without removing ratchets or wheels. We are the originators and 7 years' experience has shown us how to make them perfect.

Send for circular giving full information and prices, WRITE TODAY.

THE HEATH FOUNDRY & MFG. CO.

(Successors to The Root Bros. Co.) PLYMOUTH, OHIO



GALLOWAY GASOLINE

Owned and Made Exclusively by the William Galloway Co., Waterloo, Iowa

Owned and Made Exclusively by the William Galloway Co., Waterloo, Iowa will run your shop at several times its present capacity and enable you to take lots of jobs that you have to turn down now because you have not the capacity.

Only four things to do: Turn on the switch, turn on the oil, turn on the gasoline, give the fly wheel a start, and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs.

The Galloway has been classed as a standard, high-grade engine for 15 years. Over 2,500 in use in Iowa alone. Thousands in every other State and Territory.

If you try the Galloway engine, you will find that it is not overspeeded. Remember the bore and stroke counts and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake tests.

On the larger sizes, if it is not entirely convenient for you to pay all cash, I will take your note for the balance at the regular rate of interest for 6 months.

The price given is for the 5-horse power only, but we make these engines in seven sizes. Note my special proposition to blacksmiths. I have a plan by which every blacksmith can partly or entirely pay for his own machine. It's good; it's away out of the ordinary; and you will be overlooking a big chance if you don't write for my proposition.

Ask for my free information on stationary and portable gasoline engines from two to twentyeight horse power. We make the best, and we price them at a reasonable figure.

WRITE TODAY.

WILLIAM GALLOWAY, President.

THE WILLIAM GALLOWAY COMPANY. 577 Jefferson St., Waterloo, Iowa.

THE WILLIAM GALLOWAY COMPANY, 577 Jefferson St., Waterloo, Iowa.



Start your Gas Engine with the MOTSINGER AUTO-SPARKER

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Fully guaranteed. Operates the "make and break" and "jump spark." Charges all storage batteries for ignition and lighting on a small scale perfectly with our special switchboard in the circuit. Ten years actual service with over 36,000 Auto-sparkers in operation to testify to its merit.

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Training Outweighs Long Service

Why do you see so many young men holding positions of command over men much older-every-day scenes of long service, untrained employes at the beck of young men who occupy the higher positions? It is a case of Training vs. Long Service with the odds all in favor of the trained man.

Wherever you go, it is the man with the trained brains that holds the position of command and high salary. You have in the I. C. S. the most practical, simplest, and quickest way in the world to obtain promotion, increased salary and a successful life. don't have to leave home, buy books, or give up your present work—only part of your spare time needed. If you want promotion, a better salary, and success, mark and mail the coupon NOW.

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Please explain, without further obligation on my part, how I can qualify for a larger salary and advancement to the position before which I have marked X.

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Foreman Machinist
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Machanical Engineer
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Mechanical Drafteman
Stationary Engineer
Electrical Engineer
Electrical Engineer
Electrical Enginese

Electrician
Architect
Structural Engineer
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St. and No	
City	State
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THE DAYTON



(PATENTED.)

FOR ALL LIGHT VEHICLES. USED BY LEADING MANUFACTURERS.

Made in High-Grade Malleable Iron.

No. 440B. Buggy Size, 10 in., for 15 or 1 in. Straight Bed Axles.

No. 440C. Buggy Size, 10 in., for 12 or 1 in. Fantail Bed Axies.

No. 440E. Surrey Size, 12 in., for 1_{13} or 1_{14} in. Straight Bed Axles. No. 440D. Surrey Size, 12 in., for 1 to or 11 in. Fantail Bed Axles.

IMPORTANT

Axle Tie and Rear Perch Irons will be furnished for PLAIN AXLES unless SWAGED AXLES are specified when ordering.

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Baum 1701 Co., Omaha, Neb.
Beck & Corbett Iron Co., St. Louis, Mo.
Beck & Gregg Hardware Co., Atlanta, Ga.
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De', L. Carpenter & Co., Cincinnati, Ohio.
Campbell Iron Co., Est. Louis, Mo.
Dayton Iron Store Co., Dayton, Ohio.
Des Moines Iron Co. Des Moines, Iowa.
Faeth Iron Co., Kansas City, Mo.
C. D. Franke & Co., Charleston, S. C.
Fischer Iron & Steel Co., Quincy, Ill.
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Fulton, Conway & Co., Louisville, Ky.
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Nichols, Dean & Gregg. St. Paul Minn.
Oklahoma City H'dwre Co., Oklahoma City, Okla.
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MONTROSS METAL SHINGLES

Fire, lightning and stormproof. Light, durable and handsome. Never crack, scale or leak. MONTROSS METAL SHINGLES afford an ideal roofing. Easily laid, only hammer and nails needed; no soldering. Last a lifetime. Galvanized after embossing. Inexpensive. Our Illustrated catalogue explains them fully; sent free. Address.



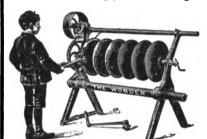
MONTROSS METAL SHINGLE CO. CAMDEN. N. J.

HELLERS' CELEBRATED AMERICAN HORSE RASPS "Tools That Wear"



The Wonder Disc Sharpeners

are in use in 36 states, CANADA and MEXICO. For sale by leading jobbers throughout the United States and Canada.



THE LITTLE WONDER.

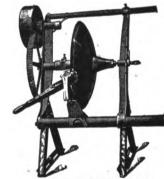
The LITTLE WONDER will sharpen any size disc up to 22 inches in diameter. The accompanying cut shows the LITTLE WONDER at work on a whole section of discs. This machine is especially adapted for sharpening Disc Harrows.

The GIANT WONDER is a larger and heaver machine; has holder attachments for rolling coulters and disc plows; will take in discs up to 32 inches in diameter; is a geared machine and will also take in disc harrow sections same as the Little Wonder and do the work equally as well. The only machine on the market with these advantages.

Can shear any part of edge to any bevel.
Can shear back from edge as far as required.
Can use tool on either side of disc. Can shift from one disc to another.

Can do all this without the turn of a set screw or nut; is a positive feed; automatically adjusts itself to wobbling or bent discs; knives made of best grade, self-

tempering steel, will last a lifetime for hand and power.
FULLY WARRANTED. We pay the freight both ways if not as represented.



THE GIANT WONDER.

Write to us direct if your dealer cannot supply you giving us his name and address. Send for circulars.

A. E. DURNER, Mfgr. EVANSVILLE, WISCONSIN, U. S. A., and LONDON, ONTARIO, CANADA.

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SCOTT'S CRUCIBLE TOOL STEELS

Made in all grades Fully guaranteed All sizes in stock

THE BOURNE-FULLER CO. IRON STEEL PIG IRON COKE

Cleveland, Ohto.

"DEFIANCE"

WOOD-WORKING MACHINERY



designed especially for Wagon and Carriage Builders

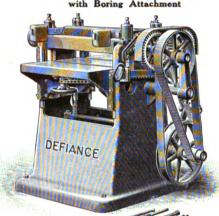
Invented and Built by

THE DEFIANCE MACHINE WORKS

DEFIANCE, OHIO

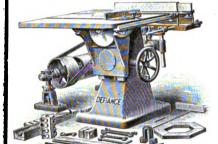






12-Inch Hand Feed Planer

24-Inch Single Surface Planer



12-Inch Hand Feed Plane

No. 8 Variety Saw-Rip and Cut-Off

Eccles Ball Bearing Couplings

ALL OUR COUPLINGS ARE SHIPPED OUT WITH TWO-PIECE BUSHINGS FASTENED IN THE COUPLINGS

When Bushings are worn out by long use they can be instantly replaced and fastened into the socket by our special process.





Patented Nov. 25, 1902 Patented June 11, 1907

The spring is pivoted at the front so that it can be turned out of the way of the wrench while clipping Coupling to the axle.

NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS

Catalog No. 15 is our Latest

We make a full line of Carriage and Wagon Forgings

RICHARD ECCLES COMPANY, Auburn, N.Y.



Seldom See

a big knee like this, but your horse may have a hunch or bruise on his Ankle. Hock, Stiffe, Knee or Throat,

BSORBINE

will clean them off without laying the horse up. No blister, no hair gone. \$2.00 per bottle, deliv'd. Book 8 D free.

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ABSORBINE, JR., for mankind, \$1.00. Removes Painful Swellings, Enlarged Glands, Goitre, Wens, Bruises, Varicose Veins. Varicosities, Old Sores, Allays Pain, Book free.

W.F. YOUNG, P.D.F., 230 Monmouth St. Springfield, Mass.

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THE PHILLIPS-LAFFITTE CO. PHILADELPHIA, PA.



NATIONAL TIRE BENDING MACHINE

for rolling steel and iron tire for wheels to a circle of any desired diameter. It will bend tire from the lightest to 10° wide by 1° thick. Is heavy and well proportioned. Furnished with tight and loose pulleys, with friction clutch pulley, or direct connected motor, if desired at an additional charge. We also manufacture solid steel loose collar axles and the National self-oiling tubular axles and steel stock and hog troughs.

WRITE FOR CIRCULARS AND PRICES.

NATIONAL TUBULAR AXLE COMPANY,

EMIGSVILLE, PA



The Roller Motion Four-Calk Heel Weight Horse Shoe

Prevents stumbling, forging, bruising and cutting the

Prevents stumbling, forging, bruising and cutting the quarters.

Quickens the action of the front feet, produces the desired fold of the leg and higher knee action.

Is a great help to all horses with sore and tender feet.

Decreases the strain of the nails on the hoof.

Made of best quality toe calk steel, in sizes 1, 2, 3, 4—three weights to each size.

For sale by Beck & Corbitt Iron Co., 1238-1246 North First St., St. Louis, Mo.; Rob't Donahue Iron & Hdwe. Co., Burlington, lowa, and other leading jobbers. If yours cannot supply you, write us direct for prices and we will supply you promptly.

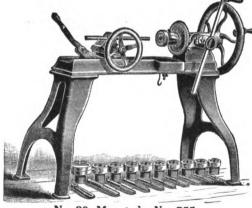
The Burlington Horse Shoe Co., Mfrs., Burlington, Ia.

"MILTON" **IRON** TIRE

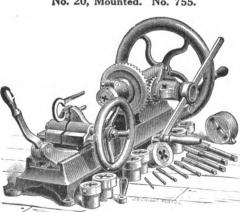
ROLLED TO SIZE-LOOKS WELL.

Our Rounds and Squares are accurately rolled. All uniform in quality. Try them.

THE MILTON MANUFACTURING MILTON, PENNSYLVANIA.



No. 20, Mounted. No. 755.



No. 20, For Bench. No. 754.

GREEN RIVER **Bolt Cutter and Nut Tapper**

Threads bolts and nuts 1-4 to 1 inch.

Strong—convenient—quick.

The price is very low.

It will pay you to investigate—let us send you our handsome new catalogue No. 34 D—free.

SOLE MAKERS.

WILEY & RUSSELL MFG. CO.

GREENFIELD, MASS., U. S. A.

Prof. GEO. E. RICH SENDS GREETING

I desire to extend to all craftsmen my best wishes for a happy and prosperous 1909.

I want to do all I can for everybody, especially during the first part of the year.

I will give everyone who wants to take advantage of this low price, my mail course in horseshoeing of ten lessons, one copy of my new book, "Artistic Horseshoeing," latest edition, together with a diploma, for \$8.

This offer is only good for 90 days from March 1st, 1909. Now is your time to get my whole life experience for \$8. Book without mail course is \$2.

Send the amount in a registered letter, or by money order, and I will forward the book at once, paying postage.

Any one who has my book of 1904 or 1907, and wants the mail course and diploma, can send me \$6 and I will send at once, but these orders must be mailed to me within 90 days to get this low price.

Here is what some of my students say:

From W. H. Bristol, Galesburg, Mich.

"Having taken your mail course in Artistic Horseshoeing I find it to be a very good thing, and would recommend it to any one that shoes horses. The book is certainly O. K. Would not part with mine if I could not get another."

From B. A. PERRY, Pittsville, Mo.

"I thought I knew something about shoeing horses, but after reading your instructions I see that I did not. I received my lesson book and diploma and am proud of them."

From Jackson Stewart, East Jordan, Mich.

"I am well pleased with the corresponding course in horseshoeing I took from you. I shod horses for years without
knowing anything about my trade, although I thought I did."

WRITE AT ONCE TO

PROF. GEO. E. RICH

AKRON, OHIO,

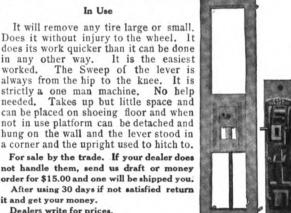
U. S. A.



Common Sense Tire Remover

The Best Machine on Earth for Removing Tire.

When not in use



It will remove any tire large or small. Does it without injury to the wheel. It does its work quicker than it can be done in any other way. It is the easiest worked. The Sweep of the lever is always from the hip to the knee. It is strictly a one man machine. No help needed. Takes up but little space and can be placed on shoeing floor and when not in use platform can be detached and

In Use

For sale by the trade. If your dealer does not handle them, send us draft or money order for \$15.00 and one will be shipped you.

After using 30 days if not satisfied return it and get your money.

Dealers write for prices.

Common Sense Tire Remover Co. DOWAGIAC, MICH.



Two New Books

BACON and MARKHAM

"FORGING" by John Lord Bacon, author of "Forge Practice," is a working hand-book of practical instruction in hammering, working, forming and tempering of wrought iron, machine steel and tool The book contains a number of useful tables and contains chapters on annealing, brazing, hardening, pipe bending and duplicating.

It also contains a chapter on electric welding, with illustrations of the machines used. The book contains 128 pages, is well illustrated, and will be sent pospaid for \$1.00.

"TOOL MAKING" by Edward R. Markham, author of "The American Steel Worker," is full of information of inestimable value to all smiths. The subject of tool making is thoroughly treated from the choosing of the metal bar to the finishing of the tool. The methods to follow for different steels and tools, the baths, how to temper, harden, anneal, heat, cool, and in

short, all the practical man wants to know about tool work. The 255 pages are well illustrated. The book will be sent anywhere postpaid for \$1.50.

Both these books are bound in red library cloth and will be sent postage prepaid to any address on receipt of price.

Send your orders to

American Blacksmith Company,

P.O. Box 974. BUFFALO, N.Y.



Plumbing Supplies OF EVERY DESCRIPTION

We carry everything in the line. This illustration shows how simple the "Roughing In" for plumbing fixtures is, with our "All Iron Pipe" System. No joints to wipe, consequently any handy mechanic can do the work do the work.

do the work.

Mr. Blacksmith, you can do this sort of work. If you do not have such modern conveniences in your home you ought to, and you ought to do this work for your neighbors, too, You may not have running water, but you can have it easily enough, with our Pneumatic Water Supply System, the prices of which are from \$40.00 up.

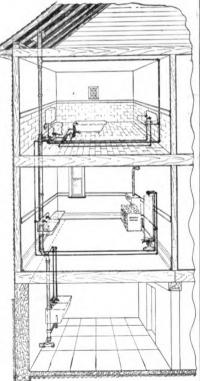
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which are from \$40.00 up.
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No. 90, covering Bath Koom
outits, from \$24.50 to
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of plumbing supplies at
equally low prices; also
hot water, steam heating,
or warm air heating material, wind mills, pumps,
pneumatic water supply
systems, gasoline engines,
machinery of nearly every
description, roofing, etc.

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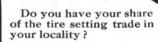
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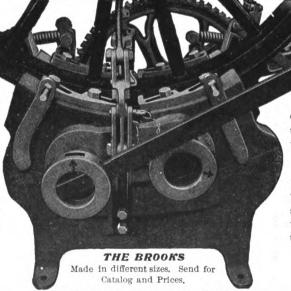
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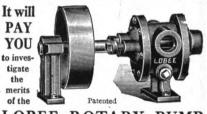
The Classified Buyers' Guide will be found on pages 44 and 45 of this issue. Whenever in need of anything it will be to your best interests to write the parties listed there.

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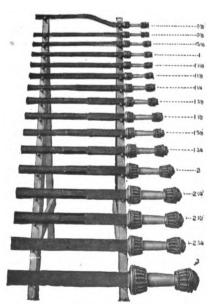
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Would you be willing to pay a dollar for an oil painting of our 1909 calendar picture? Our calendar picture has brought forth so very many words of praise and commendation from our readers and advertisers that we are now considering the reproduction of the picture on a still larger and more elaborate scale. We, however, want your ideas on the matter. If we have the picture reproduced in oilpainting style and larger and, if possible, better, would you hang one in your home? Perhaps we can devise some scheme by which you can secure one of these paintings free of charge. But the point is this, do you like the picture well enough to want it in better style and shape for hanging in your own home?

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Our Testimonials.

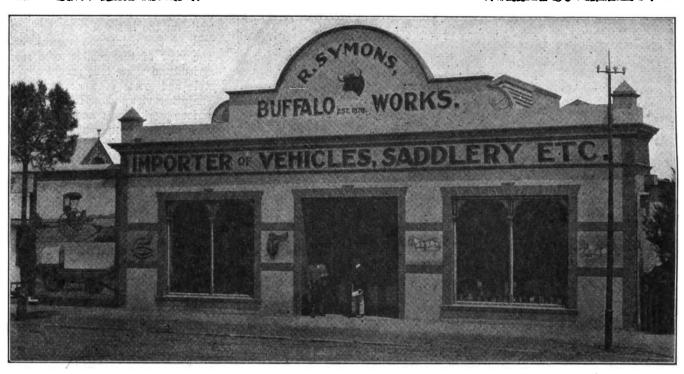
In the seven years that we have been publishing "Our Journal" we have received a considerable number of letters of praise and encouragement, and while we have published a number of these we would like you to read every one of them. There is a big pile of them. If we were asked to estimate the number we would say several thousand. And that would be a conservative estimate. They have come to us from every quarter of the earth—from every point where an English smith is located.

Suppose we, you and ourselves, read those near the top of the pile—those recently received. The first one we take up is from a Pennsylvania smith. He says: "I could not keep house or shop without 'Our Journal.' I have read it ever since you have published it." The next one is from a large manufacturer of automobiles: "We are desirous of having our workmen interest themselves in trade journals which will educate them and make them more efficient," says this letter, containing a number of subscriptions for the factory employees. Here is a letter from an old subscriber. He sends us a subscription for a neighbor smith and says: "In getting the other smith to subscribe I told him that if he didn't get his money's worth in one year, I would give him his dollar back." The next one is from a New Zealand reader. This far-away brother says: "I have not been in the trade since 1902, but simply have to have the paper. Surely greater tribute cannot be paid to the value of your paper than that of a man paying for it for six years after leaving the business." And now comes one from-but we may go on almost indefinitely. you have a neighbor smith, who is not a regular reader of THE AMERICAN BLACK-SMITH, lay this evidence before him.





THE WORKING FORCE AND A VIEW OF THE YARDS AT MR. SYMONS' SOUTH AFRICAN VEHICLE WORKS



EXTERIOR VIEW OF MR. SYMONS' SHOW-ROOMS

A Vehicle Works of South Africa

Twill no doubt surprise many readers of THE AMERICAN BLACKSMITH to learn of a vehicle works in South Africa occupying four acres of ground. Yet such are the works of Mr. R. Symons. These works are known as the Buffalo Wagon and Coach Works and are located in King Williams Town on the Buffalo River. Since the establishment of these works in 1878 Mr. Symons has built up a business that is unsurpassed by anything of its kind in South Africa. The plan of the workshops and storerooms is an object lesson

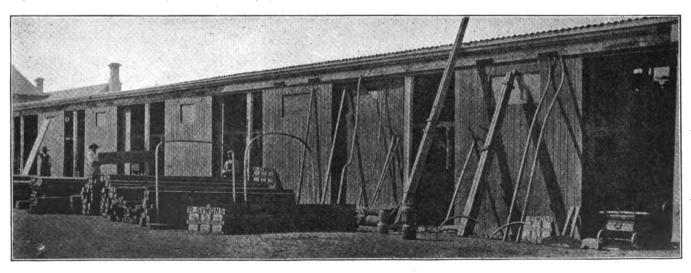
in methodical arrangement and provides for easy access to all supplies. The various departments are well organized and work is done with the greatest despatch.

The building of vehicles is completed here in every detail from the sawing and shaping of the rough logs to the painting and finishing of the vehicle, and the supplying of the harness for the horse.

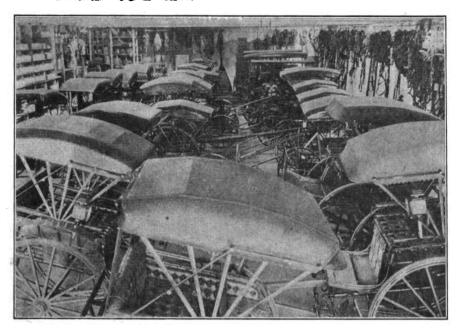
The lines carried at this large establishment comprise vehicles, harness, carriage and wagon hardware and

woodenware of every description, trimmings, paints, varnishes, besides a full assortment of blacksmith's supplies such as anvils, bellows, forges, swages and all manner of tools and machines for the smith shop.

The line of vehicles manufactured and sold at these extensive works comprises carts of all kinds, traders' wagons, municipal sanitary wagons, traveling wagons, the great trek wagons (those vehicles so invaluable to the pioneer and prospector), great trolleys (platform trucks), cape carts,



A PARTIAL VIEW OF THE TIMBER STORAGE AT MR. SYMONS' SOUTH AFRICAN WORKS



THE LINE OF CARRIAGES IN THE SHOW-ROOMS IS COMPLETE

buggies, gigs, in short anything traveling on wheels and suitable for use in the South African country. Mr. Symons also carries a considerable line of American made vehicles.

The timbers used at these works comprise ash, Australian hardwoods of various kinds, birch, ironwood, mahogany, yellowwood, stinkwood, hickory, white and

red pear, assezai and several others.

The several engravings shown herewith are from photographs and show: In the frontispiece the working force and also a section of the yards adjoining the work shops. Here a number of vehicle styles are shown ranging from the two-wheeled sulkies to the great trek wagons in the background. The exterior view of the showrooms would indicate a thoroughly modern and upto-date establishment, while the timber storage, a partial view of which is next shown, gives one some idea of the space devoted to woods used. The interior view of the showrooms shows the variety of vehicles in stock and ready for delivery immediately. Here also may be gained an idea of the other lines carried. To the right are the harness racks, in the rear the smithshop supplies and heavy hardware,

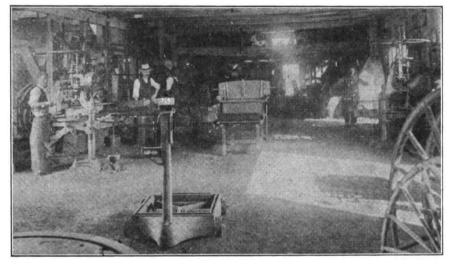
while on the left wall may be seen a part of the paint and varnish lines. The view of the exhibit at a recent agricultural show tells graphically the style and grade of work turned out. The other views show interiors of the various work shops and give one an idea of the equipment of this faraway vehicle factory. In the view showing a section of the smith shop it will be noticed that the drills used are great, large ones with floor standards, while the other machines are of like size and dimensions.

How to Set Buggy and Wagon Tires.

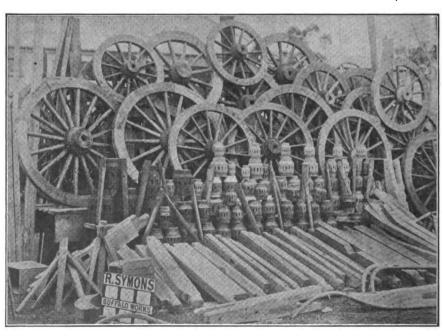
For some time I have been thinking that I would write and tell you how I set buggy and wagon tires. To start I have a cold-tire setter and have used it for four summers, and do not regret

the money I have put into it. However, I would not advise anyone to buy a cold-tire setter who hasn't at least \$100.00 worth of tire setting to do during the year.

Now, when a job comes in for me to set, I insist on the wheels being good and dry. And for buggies I mark tire and rim at the joint on the back of wheel, the n



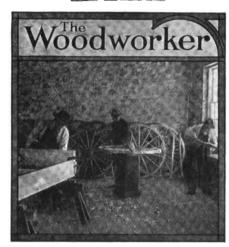
THE SMITH SHOP IS WELL EQUIPPED WITH MACHINES



PART OF AN EXHIBIT AT A RECENT AGRICULTURAL SHOW Digitized by

take the tire off and wedge every spoke that is loose. If it is rim-bound I saw out and tighten down on the spokes until all are good and tight and the rims will just pass each other without bending. I cut all wedges and ends of spokes off level with face of rim. I now put tire back on wheel, put in the four clip bolts and one bolt near center of rim. This last bolt must be on a level with the tire, for there is where I catch the wheel in my machine. Bringing the felloe clamp down between this bolt and the spoke, (if the bolt head sticks out so the tire cannot come down on the bed flat the tire is very apt to kink), tighten up that side and then turn the wheel over and catch the other side. Use a hammer to tap the tire down while in the machine, watch the dish and quit just before that takes place, which can always be told if one watches. I dish wheels when it is necessary to make them stand up, but I seldom ever dish one to injure it. When wheels are dry and the tires are freshly tightened they will dish when they get a good wetting. After the tires are tightened I put new bolts in and put the wheel through my bolting machine and soon have my job done. It takes me from twenty to thirty minutes to set a buggy wheel that way, but when done I invariably have a good job. Most of my work runs from twelve to eighteen months without requiring any re-setting.

If rim-bound I saw out. I can set four wagon wheel tires in fifty or seventy minutes by myself, take them off and put them back. I also have a good hot-tire setter which I use when expedient.



Making Wood Chisels and . File Handles.

H. B. FARTHING.

I feel that I ought to write you a letter, so I will try to tell you how I made some wood chisels with sockets for the handles. First, take a piece of §-inch pipe (if for an inch one or less), heat up one end, then push it on to the horn of the anvil and scarf it all around. Next take a piece of octagon steel, heat one end of it and also the scarfed end of the pipe, to a welding heat. Put the end of the steel into the pipe and weld. Then cut off the

make a tenon on one end to fit into the socket. Cut a ring off a piece of pipe with a hack saw and use the hollow auger on the other end of handle, drive the ring on and there you are. Just another word or two; if you want to make some nice file handles it is only a few minutes' work to do it with a hollow auger. You can make some nice ones out of old buggy spokes. Cut some rings from an iron pipe and cut a tenon on an old spoke, drive the ring on and bore a hole in the end for the file tang and you have it.

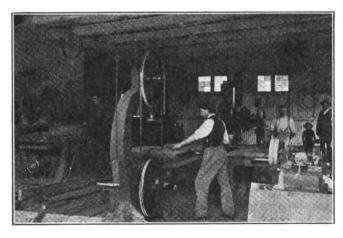
Truck Wagons.

How to Build a Strong, Cheap and Simple
Truck Wagon Body.

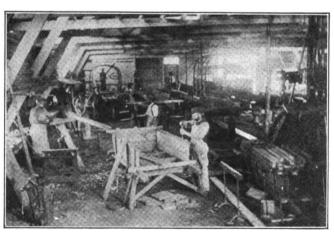
W. H. GUNN.

This wagon is to be a four-ton, four-wheel truck, twelve feet long and four feet four inches wide over all. The side panels should not be less than one fourth by seven eighths inches. Sills should be one and a half by four and three eighths inches and bottom one-inch oak. No mortise or tenon is required; neither are center lengthwise sills. Center sills are wholly unnecessary unless the "stick" is used. But the "stick" has passed away. To construct this body, we get the frame as follows:

Back crossbar three and a half by four inches, front bar one and a half by four and three eighths inches. Clamp these bars under the sills. Of course, the back bar is to be long enough to take the braces. Now scribe these



A CORNER OF THE WOOD-WORKING SHOP

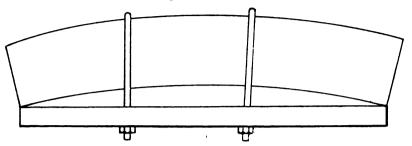


A SECTION OF THE WAGON-BUILDING SHOP

On wagon wheels, I look them over good and take out any wedges I find and knock the tire good all around the wheel so if there is any rust it will break loose. I catch a wagon wheel from two to four times; depends on how much it needs. If there is too much open joint I fill in with leather or pasteboard before I begin to tighten.

steel so as to leave enough for the chisel; draw it out to whatever size you want and cut the pipe down if too long. Then dress it off with a file while it cools, then temper. Now, take a piece of fork handle or some other piece of round wood for a handle, make it the same size as pipe on the outside and with your hollow auger

bars and let in the sill neatly so that the bottom will finish even with it. The bottom extends from the front board over the back bar, protected by an iron plate one eighth or three sixteenths by three inches wide; let this in the bottom flush and bolt to the sills, taking the side stays also. Do not cut in the sills. The center brace bar should be three by three and a half inches. Crossbars may be placed to receive the draw straps which should be about two feet apart. you will have a pretty boss punch and pin with nine-sixteenths square pin. This brace is rigid and never breaks. If the bolt should break it could be



HOW TO PREPARE THE BODY FOR BENDING

The first crossbar (just behind the gear) should be iron, so as not to be in the way of the front wheels when The backspring bar should turning. be two by twelve inches for the front and end hangers, and two by nine or ten inches for the back hangers. All these crossbars must be notched into one inch (or thickness of the bottom), so there will be an even finish with the side sills. It makes a strong. beautiful bottom and easy to repair. These crossbars must be wide enough to take two 3-inch bolts. It is not essential that the draw straps shall bolt through each bar end, but it would be better for them to go through the center of bar.

The front seat standards have a one-inch tenon which may be cut like a spoke. It answers every purpose and saves mortising. I laid off a wagon body, as above described, and had it completed, seat and all, by one man without machinery in less than three days. It has been in constant use for a year, hauling heavy freight and is little worn, never having been to the shop for repairs of any kind.

A few kindly hints to the blacksmith may not be improper. I forge the draw straps out of iron one and three-fourths by one-fourth welded to 1-inch round iron. Never use steel. The welds are made in a bottomswedge groove. The angle or flareboard irons are forged out of fiveeighths by 13-inch iron and bent in a former at an angle of forty degrees. The tale gate hinges are out of onehalf by two-inch iron merely curled over to receive a 3-inch rod. The four side braces are forged out of 7-inch round iron. A straight brace is stronger than any other. Take a piece of iron long enough to make them, heat the end to a soft white heat, dip in sand slightly, bend one and a fourth inches from the end, let the helper strike a blow or two and

easily replaced. I have frequently forged and bent (ready for welding) these stay ends with one heat. Piece out angle irons to body instead o drawing them.

How to Prepare Truck Body for Bending.

Get outside panels with main curve of two and a half to two and three fourths inches about one third. distance from the front of body as per engraving. Lay off frame line for screws three fourths of an inch from outer edge of sill. Bore holes for No. 16 wood screw, twelve inches apart from top side; countersink the bottom of sill

sill. Bore holes for No. 16 wood screw, twelve inches apart from top side; countersink the bottom of sill and then gauge line half the thickness of panel from center line as guide to line up. The draw-strap holes may all be bored, but bore two on either side and forge four hook bolts to pull panel and sill together. Have two light right-angle knees fastened in front or back with hand clamps. Now, screw down the four draw bolts and the bend is easily made. Put in screws and front board and the body

How to Hang Truck Body.

is ready for the smith.

As manufactured gears have about stocked the market there is very little forging to be done. The top part of gear can be made cheaply and durably with three crossbars. The center bar should be three fourths of an inch wider than the others in center to receive king bolt. These bars should be confined at the top with two plates of iron with \(\frac{1}{2}\)-inch lags. Let the bars have three to four inches bearing on the wheel surface in width.

The fifth-wheel holes should be equally divided and as large as the iron will admit. But, as the countersinks are heavy, we must not follow the one third rule of mathematics. There must be more than two thirds of the metal left in the fifth wheel for strength. If an ordinary gear is used the top gear bars should be five inches deep and the body raised above the front wheel

seven inches by the spring blocks. This will level the gear if the wheels are twelve inches different in height. It is a mistake to have top gear bars six or eight inches. There is too much strain on the bolts. In order that this body should hang properly springs of standard sweep must be used.

Clipping on Back Springs.

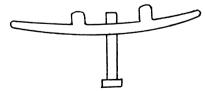
The spring should not be clipped to the axle direct, but an iron or wooden block is necessary to prevent the wear on the spring. I forge a simple block by taking a piece of 5%-inch iron the width of the spring, bend down both ends, one inch at right angles, double both ends over to fit the axle, then fit the top of spring white hot.

A Shop-made Jointer and Some Other Machines.

w. f. segelhorst.

The main frame A is of four by five wood. The front end of the frame is shown at B. This also shows the little wheel, fastened to the crosspiece, for lifting the front table up and down. This wheel is fastened on a half-inch rod. The rod should be long enough to reach under the front end of the front table. Have a good thread on that end of the rod and fasten a piece of iron under the table. Drill a hole in this iron and at that end in form thread it to fit the threaded rod. This arrangement moves the table backward and forward and at the same time raises and lowers it, as the table rests on slides, see Fig. D. One set of these slides must be fastened to the under side of the table and the other half on the inside of the main frame.

A rear end view of the machine is shown at C. The hind table E is made of two-inch hardwood, sixteen inches wide. I may say that perhaps some of my brothers do not need such a



AN EASILY MADE SPRING BLOCK

wide table, but I do. I have to make a lot of water troughs of two by fourteeninch lumber and I dress them and joint them on this machine. The hind table should be fastened on two pieces of wood, two by two feet and twenty inches long, not more than six inches from the ends of the table.

Let the ends of the two by two by twenty, in the main frame, rest on four set screws or bolts, see Fig. F. Thus you can level it with the cutter head. I also have iron plates on the ends of my tables next to the cutter head to keep it from tearing in.

The cutter-head shaft is made of crucible cast steel, one and a half inches square, but, I believe, good shafting steel will do. Take a piece thirty inches long, turn four inches of it down on one end, then square sixteen inches of it for your knives and turn the balance for your four-inch box and pulley.

My pulley has a five-inch face and is four and a half inches in diameter. It is made of 7-inch poplar lumber (bone dry). Cut six circular pieces out of the 7-inch stuff about the size of the pulley. Put one piece on the spindle after boring two 3-inch holesone on each side of the circle—in the piece, then put a 3-inch iron pin in one of the holes. Cut a groove in the second circle for your pin to go in, then put three more rounds on, then the other pin and then the last round: fit them on tight with glue and wood screws. Then turn off and you will have a good wood pulley.

The knife is two and a fourth inches wide, five-sixteenths of an inch thick and sixteen inches long. It is best to buy them ready made. I have made mine, see Fig. H., out of tool steel, but failed to get the temper good enough. I made my bolts out of Norway iron one half inch in size and three bolts for each knife. Get your bolts even

The only objection I have is this, it cut the first link of my index finger on the left hand about a year ago. Of course, carelessness is the only excuse for such things. I was in too big a hurry. It made me awfully discouraged, but I received your paper that day and after I had my finger fixed up I sat down to read and the first thing I read was that a brother craftsman had also cut the same finger on his hand. I forgot about my finger then for awhile and it is needless to say that I will look out so it does not catch me again. I have worked on the machine or one like it for seventeen years, and if I had to do without it I would quit the trade.

I also have a 36-inch bandsaw, my own make, and it runs perfectly and gives good satisfaction. I use them most every day. To tell a fact, I don't know when I did last use my hand ax, and before I rip a ten-foot cypress board by hand, I will start up my six-horsepower gasoline engine and rip it with my bandsaw and joint it with my jointer. I also have a 24inch planer with which to dress boards. This I have made myself and it does fine work. I have a boring machine for wood and iron, emery wheel, a hot and also a House cold-tire shrinker. It is my friend, but you must know how to handle it. I have two fires in busy plow-sharpening time. I am a wagonmaker myself and have my blacksmith hired, whom I am proud to say is the best plow man in the west end of our county. The trouble is we do not get paid what this work box. It works fine. If anyone wishes to know something about my machines I will be glad to let him know, and if he is not too far from Illinois it would be best for him to come and see me.

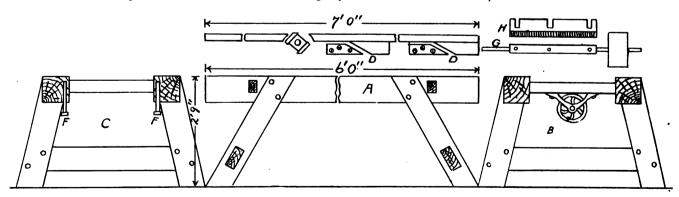
Thornton's Letters.-23.

Being "Straight-from-the-shoulder" Talk from a Prosperous Self-made Smith to his Former Apprentice, now in Business.

Dear Jim:

You say you don't understand why you don't get a bigger lead on this business game. To quote an advertising phrase, "There's a reason." There's a reason for everything, Jim. If you've looked into everything else perhaps it's your way of figuring profits, expenses and such things.

Now, let us suppose that every dollar you take in is divided into the following coins: one fifty-cent piece. four dimes and two nickels. Do you know what becomes of those seven coins? Let me tell you what should become of them. The fifty-cent piece, one dime and one nickel should go back into the business to buy new stock, new tools and the like. Two of the dimes should go toward expenses such as rent, light, heat, help and insurance. The remaining dime and nickel are your profit. From these must come your living expenses, amusements, clothes and savings for the rainy day. Every dollar you receive should stand that same division and every loss or mistake vou make comes right back onto that last fifteen cents. Sometimes your loss eats up the nickel and dime, and chews on the two dimes



THIS SHOP-MADE JOINTER IS BASILY MADE AND A GREAT LABOR-SAVER

weight—don't forget it, and after you have your knives ground or sharpened weigh them to make your machine run smooth. Speed about 3,000 revolutions per minute.

Maybe some will like this jointer and maybe some will not. It is good enough for me and I have made some for others and they were well pleased. is worth. We get ten cents for a 12-inch plow and fifteen cents for a 16-inch plow, and if they are sharpened like my smith does it they are worth more.

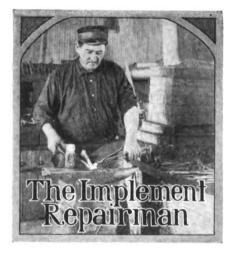
Just last week my blacksmith and I made a little punch machine for punching holes through the irons which we put on the inside board of a wagon of expense. Sometimes loss goes back farther and nibbles on the sixty-five cents for stock. When it does that it's time to sit up and take notice and swat loss a good, hard one with a big stick.

Perhaps this is the case with you. See if your losses aren't eating up parts of your dollar that should go

for other things. That last nickel and dime are the most important of the whole bunch. Upon them depends the comfort of your family. Watch the last nickel and dime closely, see that they reach your pocket. Don't let them get sidetracked into either expenses or business. They belong to vou just exactly as much as the wages belong to your help.

It's all well enough to get people to trade with you-to have them bring their work. It's right to give them what they want. It's business to have good stock, good men, good equipment and all that. BUT-and I cannot emphasize that but too much—if you don't keep both eves on that last nickel and dime you may as well not have the other features. A good business is all right, but unless vou keep an eye out for net profit vou may as well shut up shop. Of course, to get net profits you must have the business, so get the business and at the same time look out for net profits. Yours for better business.





A Shop-Made Bolt Clipper. AUGUST HOLMGREN.

The accompanying engraving shows a very easily made and very serviceable bolt clipper. As shown, one of the jaws and its accompanying handle are in one piece, and stationary. The other handle operates the movable jaw by means of a riveted joint. This gives a shearing action that enables you to cut a bolt very easily. The device is twenty-seven inches long and will cut seven-sixteenths inch mild steel. I hope this will be of benefit to my brother smiths. This very useful tool can be constructed at very slight expense compared with its worth and utility. The cutting jaws must, of course, be hardened and tempered

so as to cut bolts easily and without breaking down.

A Handy Helper for the General Shop

WILLIAM ANDERSON.

The engraving shows a very handy overhead hanger for the shop. In making it, the size of iron and length can be made to suit each individual shop owner. The size I am using is made of 56-inch by 13-inch flat iron, five feet eight inches long. One end of the upper half is bent over seven inches with a spread of two inches to take a small roller which I made of two-inch gas pipe, 12-inches long, and fitting same with wood, and then boring a 3-inch hole through the center for a 3-inch pin; bore the holes through the iron seven sixteenths of an inch, so the pin will turn easily. Turn the other end of the piece at right angles one inch long, bore or punch a %-inch hole as close to the flat bar as possible through this lip. Then bore several %-inch holes through the flat bar about three fourths of an inch apart. Next take a piece of 1-inch round iron five feet six inches long and make a short hook on one end and a wide one about six inches on the other end The hanger is then complete.

For a track I use a 11-inch gas pipe hung on two pieces two by four inches from the rafters to about ten feet from the floor. This hanger or rest will be found very useful over the anvil and can be adjusted to different heights in a moment, by changing the hook in the various holes. By having a track over the drill press the same rest can be used for holding long bars in drilling, etc. It never gets kicked over and takes but very little room when not in use, as it can be hung on a nail in the wall.

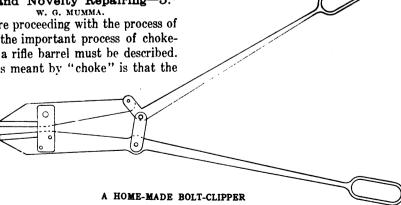
Gun and Novelty Repairing-5.*

Before proceeding with the process of rifling, the important process of chokeboring a rifle barrel must be described. What is meant by "choke" is that the must fit perfectly for the entire length of the barrel. There must not be any loose-fitting spots for the bullet at any place in the barrel. Nor must the bullet fit loose at the breech or powder chamber: and in the chokebore the bullet should fit slightly tighter at the muzzle for about one inch from the end of barrel. A very small fraction of an inch will do. In no case should the muzzle of the gun be bell-mouthed, thus

> making the ball fit loosely. The choke is made by reaming or by using a freshing tool described at another place.

To recut the rifling in an old barrel that has become worn out or partly worn, proceed as follows: If the grooves are entirely worn out the barrel will have to be rebored and the grooves recut. Generally, however, they are only partly worn and need to be cut a little deeper. If the barrel is rusty and dirty this needs to be cleaned out. The lands can

cleaned up by using a freshing The saw will cut the rust out of the bottom of the groove. To do the recutting by hand, take a wooden ramrod and cast a cylinder of lead on one end of it by wrapping end of rod with tow and pouring lead after rod end has been inserted in barrel. If this is properly done the impressions of the grooves will be shown on the lead. Then cut out a mortise in one of the ridges on the lead, corresponding to one of the grooves; place a saw blade in the mortise and work the rod back and forth in the barrel, using plenty of oil. The impressions on the lead will follow



A HANDY

HELPER

barrel is smaller at the muzzle than anywhere else in its length. If the bullet should be loose in the barrel it will shoot anywhere but the right place. The ball

Copyrighted, 1908, by W. G. Mumma,

the grooves in the barrel if not too much worn. Always work from the breech end to the muzzle and cut but one groove at a time. This is a slow and tedious way to do the work, but it

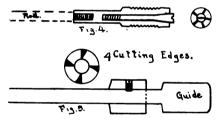
FIG. 3.—A RIPLING MACHINE THAT CAN BE MADE AT SMALL EXPENSE

is a cheap method to use, and in the absence of a machine it will serve very well. Be sure that the bore is cut out so that the bullet will fit tight the entire length. In casting the lead, use some oil in the barrel. It will make the lead slip and fill easier around the rod. The saw should be hardened about as hard as a file. In using the freshing tool to clean the lands fasten it to an iron rod and use plenty of oil. It will file out a barrel inside completely, leaving it bright and clean. After the rifles are sawed out finish up by using emery powder on a piece of tow or candlewick, fastened on the end of a wiping stick. and work it back and forth.

Breech pins and plugs or cylinders can be bought in the rough and then fitted and finished up to suit the barrel. The recess can be cut out by using a counterbore, with a guide to fit the bore of the barrel. The threads can then be cut in with a die and tap of most any standard make. The tap needs to be of a bottoming pattern and also short, cutting about fourteen threads.

The breech loaders have their grooves cut out in the factories by machinery made especially for the purpose. The grooves are all cut at one and the same time, so as to be quickly done. A breech loader is rifled opposite to that of a muzzle loader. A muzzle loader has narrow grooves and narrow lands and the grooves for a breech loader cannot very well be cut by hand, as for muzzle loaders. By looking through a breechloading barrel one will notice thin narrow ridges standing up from the surface of the inside of the barrel. These cut into the bullet, instead of, as in a muzzleloading rifle, the bullet sinking into the grooves. The bottom of the grooves is about the same size as the bullet, making a tight fit, with a slight choke at the muzzle. If these ridges get worn out

they cannot be recut the same as an old muzzle-loading rifle, but the barrel will have to be rebored and rerifled to the next larger size. For instance, if a twenty-five-caliber becomes worn out, it is rebored and rerifled to a thirty or thirty-two-caliber, if the barrel is heavy enough. The best way, however, is to



A RIFLING TOOL AND ALSO ONE FOR CHAMBERING

get a new barrel. Reboring and rerifling is only applicable to single-shot breech loaders. In a repeater the whole breech mechanism would have to be changed to suit the next size of cartridge, and one might as well get a new gun. Besides, there is a slight difference in size and weight of barrel for each caliber.

All of the breech-loading rifles are made to certain standard calibers: Twenty-two, twenty-five, thirty, thirty-two, thirty-eight, forty, forty-five, fifty.

Some few are used for special purposes, all using cartridges.

In engraving, Fig. 3, is shown a rifling machine which the writer redesigned from old devices. It can be made at slight expense. This device can be adapted for most any kind of work on gun barrels. In Fig. 4 is shown a rifling tool which cuts all grooves at one time, either breech loader or muzzle.

The chambering tools for chambering out barrels of breech loaders can be bought ready-made, or one can make one himself at a slight expense as shown in Fig. 5. To recut the recess in the breech of a rifle barrel make a tool as follows: First, make a guide of soft steel, with a long stem to fit a brace the exact size of bore of barrel. Then make a cutter to fit the stem of the guide. Make the cutter with rounding corners. with four or five cutting lips filed on the corner. This should have a small set screw to hold it fast on the stem. Set it back a little from the shoulder of the guide, so as to leave a place for the chips. The cutter needs to be enough larger than the outside of shell of cartridge, so it will not stick fast. One for each caliber has to be made. They will be needed quite often, besides, they can be used on a variety of other work. To

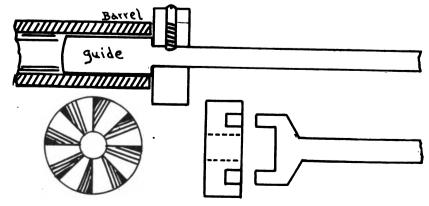
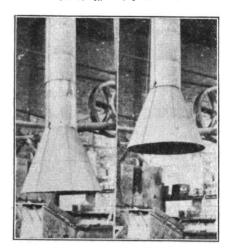


FIG. 6.—A MILLING TOOL IS BASILY MADE
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FIGS. 1 AND 2.—SHOWING STACK IN USE

cut the recess for the rim of the cartridge another cutter is made to work on same stem. The cutter is made so that it will cut a square corner in the recess. Fasten it with a set screw and file four or five lips on the end. The guide needs to be bushed with a cartridge shell, or the cutter can be set just back of the chambering cutter. The cutters will need to be tempered very hard.

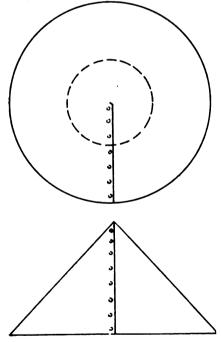


FIG. 3.—THE HOOD IS OF ONE PIECE

A milling tool for squaring up the ends of barrels is also needed. Make a hollow mill out of good tool steel, as shown in Fig. 6, and harden it quite hard. Make it about one and a half inches outside diameter, and about one inch long. Put a set screw in it, so it can be fastened on a stem or guide; drill a hole about one half inch in diameter. The guides can be made or bushed any size to fit any sized gun. The ends of the barrels of guns, either shot or rifle,

can be faced up as well as a variety of other work. This cutter can be used to face up shoulders on large bolts, screws, breech pins and other work of a similar nature. Drill two holes, about one fourth inch in diameter and one half inch deep, opposite each other. Make a forked stem to fit the brace, as shown in cut. One can face up any piece that has a collar, shoulder or head on it. Several sizes should be made for different sizes of work to be done.

(To be continued.)

The Telescope Stack. How Made and Used.

This device is, without doubt, a great convenience and a shop comfort even in a shop with plenty of good ventilation. The stack is suitable for use over the forge, hardening bath or, in fact, any place about the shop where soot, sparks or steam originates.

Figures 1 and 2 show the stack in use over a hardening tank. Fig. 1 showing the stack pulled down close to tank, while Fig. 2 shows it pushed up out of the way after the case-hardening boxes have been dumped. In Fig. 3 is shown the hood or cap for the top of the stack. The stack, if large, should extend about ten feet above the roof of the shop, while the hood or cap is about two feet above the rend of the stack and supported by four braces, as shown in Fig. 4.

These braces are bent, as shown, to fit along the inside of the hood and are riveted to both hood and stack. The movable section of the stack is shown in Fig. 5. This should be made of a size to suit the purpose for which it is used. The hook A, Fig. 5, is riveted to the funnel and shown to better advantage in Fig. 6, where it will be noted that the movable section is balanced by weights. In this engraving A is a section of the shop roof, B is the movable section of the stack, CC are the hooks, DD small wire cables, EE small pulleys to carry cables and large pulley over which cables are led to the weights HH. The pulleys are held in place by straps

GGG. The damper J is brought into use when the stack is up and out of the way. This prevents the cold

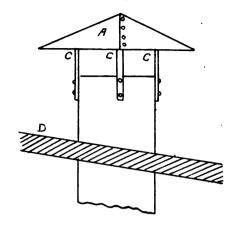
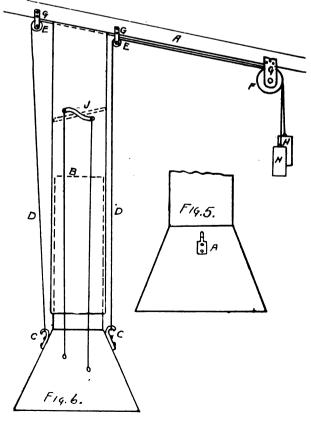


FIG. 4.—THE SECTION ABOVE THE ROOF

air from entering the shop when the stack is not in use.

A stack of this kind, if properly constructed, will draw dust and dirt out of the shop at a surprising rate. Of course, if a damper is put in, this must be opened before the stack will draw. The damper is really necessary, if you want a warm shop in winter, as the draft of the stack will carry out warm air just about as quickly as you can make it. The damper, to work properly, should fit the stack neatly at all points, and must, of course, be up high enough in the



THE ARRANGEMENT OF THE SLIDING SECTION

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stationary pipe to be out of the way of the sliding part.

Calculating the Weight of Stock-2.

NELS PETERSON.

Now take a piece of flat iron, 12 inches by 2 inches, and 12 inches long; multiply the width by the thickness and then multiply by the length of the piece.

Example: 1.75 multiplied by .75 equals 1.3125; 1.3125 multiplied by 12 inches equals 15.75 cubic inches; 15.75 multiplied by .28 equals 4.41 pounds—weight of a piece of flat iron, 1\(\frac{3}{4}\) inches by \(\frac{3}{4}\) inches by 12 inches.

With square iron let us take a piece 11 inches square. The area of the cross section is 1.5625, which multiplied by 12 inches equals 18.75 cubic inches. This multiplied by .28 equals 5.25 pounds in a piece of square iron 11 inches by 12 inches. This rule holds good with any size of iron.



"Hello! stranger," exclaimed Benton as the Editor entered the "forge room" after an absence of several weeks. "Where've you been for the past few weeks?"

"Oh, I've been out on a little tour of inspection. Been out among the boys in the big shops up in Illinois."

"Anything new?" questioned Benton as he brought out his notebook and pencil.

"Not in that line," returned the Editor as he settled down comfortably in his favorite chair. "But in the line of new ideas in managing a large shop I got enough material to start a college." Then continuing, the Editor said: "If you've ever worked in a big shop and by the piece-work system you know how much trouble the men, foremen and superintendents have in agreeing on a favorable scale. You know, too, how ready the office end of a big plant is to shave that scale when any of the men put on a bit more steam and fatten their pay envelope a little. Well, I could never understand why at these shops the piece-

work scale is shaved every time the men speed up on output."

"I've never worked under the piece-work system," said Benton, "but I can't see any reason why the concern shouldn't cut the scale when the men show that they have not been working up to their greatest capacity. He's the same man and, as I see it, is worth the same money."

"Yes, Benton, he's the same man, but his employer is buying his services, not the man. On the other hand, if that same man does more work in a day, turns out more pieces of his particular work, he increases the plant's output without a cent more being spent for equipment, taxes, rent, buildings or anything but that man's labor. Do you see where the employer of that man wins out? You didn't see it that way before because you've never worked under the piece-work system."

The Editor then took several cards from his pocket and continuing said, "In the early part of last year a big manufacturing concern in the Middle West landed a contract to supply a certain number of their productions in a certain time. The contract was really taken with the idea of enlarging the plant in certain lines. However, before making final arrangements for the enlarging it was suggested that perhaps the equipment they had would do. Accordingly, a conference of foremen and department heads was held. That the men were not working up to their full efficiency was tound to be a fact and, after arguing the matter for some time, the management of that concern promised to let the regular scale for all piece workers remain as it was for at least one year regardless of the extra work done. A summing up at the end of the year disclosed the astonishing fact that the output increased forty-eight per cent, while operating expense, plant equipment, taxes and so forth remained the same."

"For several years the heads of large plants have paused and pondered long over the undoubted restricted output in their plants. They believed, and rightly too, that the men weren't putting forth their best licks all the time. The outgrowth of investigation in these plants is the bonus system of paying piece workers. This system is nothing more or less than dividing the worker's time with him. That is, if the man does his work in less time than the time allowed the ordinary workman that time he saves is divided between workman and employer. For instance, in a large railroad shop of the Middle West the men on a certain line of work at the day rate receive three dollars a day. The time rate on their work is fixed at three hours. One of the men can do it in two hours, thus saving one hour on every piece of work of that nature done. The man receives credit for his half of that hour and for every one thus saved. And instead of receiving sixty cents for two hours' work he gets seventy cents. That man increases his output per week, if he stays on that work for an entire week, just exactly ten pieces, and at no extra expense for equipment."

"This bonus system is something new, isn't it?" questioned Benton.

"No, it's not so new. It's been in use in some shops and plants for several years," returned the Editor. "In the case of another railroad shop the installation of the

bonus system resulted in an increased output of fifty-three per cent the first year, while the cost of labor for the product turned out of that shop was cut down some thirty per cent, although the wages paid the men increased nineteen per cent. And all of this without an extra cent paid out for more equipment or buildings, no extra taxes, no extra men, no extra tools."

"Another system I found in use was operated under the regular piece-work system and allowed the men a certain increase without a cutting of the piece-work scale. For instance, a man is working at a twenty-cent per hour rate. That man can, by increasing his output, make as high as three dollars per day or increase his wage fifty per cent. But should he go over fifty per cent while on piece work the rate is likely to be shaved. I met an old-timer who told me that he began as an apprentice in a large, far western shop. He told me that in those days a man could make thirty dollars a week and do but very little work and some men would make as high as sixty and sixty-five dollars a week, until the management found they were paying the men more than the superintendent, and as a consequence the shop was moved and now



AN IOWA SHOP RUN BY MR. C. G. LAMORBUX

a man has to work mighty hard to make three dollars a day.

"Another man, a foreman in one of the medium-sized shops said that the installation of the bonus system has placed his shop ahead of work for the first time since he took charge. A year ago, he said, when an order came in for a spring hanger other work had to be stopped to make it. Now he takes one out of the storeroom. And the same thing is true in most everything else."

"That system seems to me solves a good many problems for the large shop,' agreed Benton. "The men, I do not believe, can find any objection to working under this system. I understand that it is sometimes difficult to get the men to agree to work by the piece-work system when they are working by the day."

"The advantages of the bonus system are many and it is probably the most equitable system that has been installed in large industrial plants." And the Editor turned to his desk and a pile of accumulated

manuscript
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The Wonderful One-Hoss Shay.

OLIVER WENDELL HOLMES.

(Concluded.)

Do! I tell you, I rather guess
She was a wonder, and nothing less!
Colts grew horses, beards turned gray,
Deacon and deaconess dropped away,
Children and grandchildren—where are
they?

But there stood the stout old one-hoss shay As fresh as on Lisbon-earthquake day!

EIGHTEEN HUNDRED;—it came and found The Deacon's masterpiece strong and sound. Eighteen hundred increased by ten;—
"Hahnsum kerridge'' they called it then. Eighteen hundred and twenty came;—Running as usual; much the same.
Thirty and forty at last arrive,
And then come fifty, and FIFTY-FIVE
Little of all we value here
Wakes on the morn of its hundredth year
Without both feeling and looking queer.
In fact, there's nothing that keeps its youth,

So far as I know, but a tree and truth.

(This is a moral that runs at large;
Take it.—You're welcome.—No extra charge.)

First of November,—the Earthquake day:
There are traces of age in the one-hoss shay;
A general flavor of mild decay,
But nothing local, as one may say.
There couldn't be,—for the Deacon's art
Had made it so like in every part
That there wasn't a chance for one to start.
For the wheels were just as strong as the
thills,

And the floor was just as strong as the sills,

And the panels just as strong as the floor, And the whipple-tree neither less or more, And the back crossbar as strong as the fore,

And spring and axle and hub encore. And yet, as a whole, it is past a doubt In another hour it will be worn out!

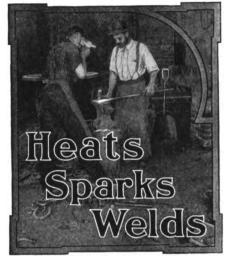
First of November, Fifty-five!
This morning the parson takes a drive.
Now, small boys, get out of the way!
Here comes the wonderful one-hoss shay,
Drawn by a rat-tailed, ewe-necked bay.
"Huddup!" said the parson.—Off went
they.

The parson was working his Sunday's text; Had got to fifthly, and stopped and perplexed

At what the Moses—was coming next.
All at once the horse stood still,
Close by the meetin'-house on the hill.
First a shiver, and then a thrill,
Then something decidedly like a spill,
And the parson was sitting upon a rock,
At half past nine by the meetin'-house
clock.—

Just the hour of the Earthquake shock! What do you think the parson found, When he got up and stared around? The poor old chaise in a heap or mound, As if it had been to the mill and ground! You see, of course, if you're not a dunce, How it went to pieces all at once,—All at once, and nothing first, Just as bubbles do when they burst.

End of the wonderful one-hoss shay. Logic is logic. That's all I say.



And then again some men are more persistent setters than a Plymouth Rock hen.

If you are a good shoer and want to locate in Iowa write Mr. W. T. Charnock, of Cedar, Iowa.

John Hogan says: "They can charge what they like for their work—I must get paid for what I know."

"I have been successful because I not only make sure of a profit in selling but in buying, too," said Thornton.

Hollow cast-iron blocks in place of fire bricks above the melting zone in cupolas are said to withstand erosion better than bricks.

More popular than ever are the pink buffaloes. Do you use yours freely? Don't be afraid to ask for more—we've got lots of 'am

A good time, right now, just before the spring rush, to clean up shop a bit. You'll be better able to care for the extra work and you'll care for more of it.

A clock pendulum said to be the longest in the world is hung in England. The rod is twenty-two feet long and carries a ball weighing two hundred pounds.

Extra profit is what it means. without any greater outlay for rent, heat or other running expense. And right now, just before spring, is the time to install a side line or two.

Addressed to you are the "Timely Talks with Our Subscribers." and you'll find something of interest on that page every month. Turn to it now, if you haven't read it.

Of course, anybody is liable to be wrong at one time or another, and the boss is no exception. But when it's on the boss don't tell his customers or his competitors tell him.

With a strong pull, a long pull and a pull all together, let's pull harder than ever for more trade. The hard, cold winter is behind us now—nothing before us but spring and more business.

Do you reply "yes' or "no' when the autoist asks if you can fix his machine? Lots and lots of "Our Folks" are turning the autoist's misfortunes to account. Better take time by the forelock and prepare to care for the broken-down auto.

Price and quality are both important factors in the getting and holding of cus-

tomers. You'll not stay in business long if you cut the price and raise the quality, neither can you afford to raise the price and cut the quality. Let the price be an indication of the quality.

Team work counts in everything, and nowhere so much as in the smithing trade among its members. Harmony among craftsmen in your county will go a long way to smoothing the rough places. A request for plans for the formation of branch associations will start you right.

Who gets the most out of a good craft idea—the man who tucks the idea away in the far corner of his private safe or the chap who, while the first one is doing the tucking, gives the idea to the craft world, with his name attached, and makes use of it at the same time? There's a moral to this.

It is a common error, when grinding steel and cast iron, chilled iron and hardened steel, that to produce a fine finish a wheel must be as fine as the surface desired. A coarse wheel will produce a fine finish if certain facts about grade, depth of cut, speed of work and speed of wheel are observed.

One day last week we called around,— Friend Tom was awful blue; Said he'd kept shop for forty years, But couldn't keep custom too.

"This business suits me lots of ways,
"But tell me how," said he,
"I can keep on keeping shop,

"But the blamed thing can't keep me?"

Some men, they're not smiths, think that ten hours a day at the anvil will teach them all they need know about the trade. Experience is all right, but one man's experience alone will never point the way to success. The royal receipt calls for equal parts of experience and right reading, mix thoroughly and use liberally.

Two heads are better than one. The mutual consideration of methods, the exchange of ideas, the voicing of suggestions and opinions—these things bring out the best that is in us as members of the craft. Let us, one and all, resolve to make more use of "Our Journal" as a medium for the exchange of ideas and opinions.

"In looking over Neighbor Brown's January paper," says Tom Tardy, Jr., in a note to the Editor, "I notice that you didn't like it because dad closed shop at the regular time on that Friday. Now, let me tell you there was good reason for that.—Dad and I was agoin' to a smoker given by his lodge, and we were late, at that. You fellers better look into things a bit before you go writin' things like that." T. T. Jr., is evidently a chip off the old block—he certainly believes in pleasure before business.

And now comes Mr. Maxim with a "silencer" that can be screwed on the end of a gun barrel to make it absolutely noiseless. The silencer is a piece of steel tubing six inches long containing a series of ten pierced disks so arranged as to allow a free and unobstructed passage for the bullet, out interrupting the passage of the powder gases so that no sound is made. This new device, coupled with the use of smokeless powder, will make Gen Sherman's definition of war truer than ever.

Association Notes.

My "One Man Association" which I wrote to you about a year and a half ago is still in existence and prospering. I mind my own business but feel very sorry for my neighbor smiths. I continue to get my own prices and never think of returning to the old or to competitors' prices. I want to tell you truthfully that I have not had even one complaint about prices and have all I can do the year around. The average blacksmith thinks he is not to be classed as a progressive business man. Now, just let us all stand up for our rights and be men.

John M. Pfeiffer, Wisconsin.

An Interesting Letter from Michigan. In a visit last fall to Genesee and Livingston counties in New York I found most all the blacksmiths and horseshoers at work for small prices. It struck me that that which needed to be done was being neglected. One can get horses shod new for one dollar, and four shoes reset at from forty to sixty cents. I saw one man shoe a horse new in front and set the old front ones behind at seventy-five cents for the job-just what I would have gotten for the new shoes alone. He seemed satisfied with the price. I asked him why he did not shoe horses for nothing, and he was offended and said his regular customers would not pay a higher price. I asked him who fixed his price, his customers or himself. Of course, he said, they could get work done in other shops at the same price. Being quite a Yankee I asked another question, "Will your customer sell you butter for twelve and a half to fifteen cents per pound or eggs for ten to twelve cents per dozen and other farm products in proportion?" "No, sir," he said, "They don't have to. They can take them to the stores and get more than that." said, "My friend, why don't you and your neighbor shoers and smiths get together and fix a price according to the prices you have to pay for the products your customers sell and get what your work is worth?" A changed expression came over his face. "I never looked at it in that way," he said. He was soon all over being mad and found out that I had spent forty years of my life around the horn of an anvil, and began to inquire something about conditions of things where I am doing business. We had a pleasant visit. It seemed to me that a county organization in that part would be a good thing, and have meetings in the larger towns or have a tri-county organization and meet in the larger towns and organize locals and take in men who are running shops in small places where there is only one or two shops in a place. That is the plan we work on and we find it works quite nicely and is beneficial to all.

There has always been a discrimination against the county mechanic by the city men, and some small cities at that. But you let the average city man go into a country shop and undertake to handle the work that comes in and he will be ready to go home when it comes Saturday night. Take, for instance, horses that are not shod oftener than once in three or four months. It is more work to fit one foot than it is generally for all four where they are shod once in three or four weeks. Then take the repair work. Everything on a farm to repair goes to the general blacksmith, mowers, binders and all kinds of hay and harvest

tools, beside plows, drags, drills and cultivators, discs, planters and many more things I have not enumerated, and all must be repaired. Some light cast pieces have to be replaced with handmade wrought-iron ones. Some can be patched so they will go, but, on the whole, it takes a good deal of ingenuity to know how to do the job. Besides, a man has to have an unlimited supply of patience, for some of it needs handling very tenderly or more repairs will be needed. Well, after all is done, if you charge a reasonable price for your time and stock, to say nothing of the knowledge you have used in doing the job, frequently there comes a kick, the price is too high, and then again your customer says, "charge it." There is another hard shot; you have to wait until he gets ready to pay or he will have something to kick for again. When did your farmer-customer take anything to market, from a half dozen of eggs to the most valuable load of farm produce he ever drew, and have it said to him, "We cannot pay today, come in some other time or send in your bill."

Well, I have written about enough of this. We all have spells when it does us good to relieve our minds. Perhaps it may not do the Editorial Department any good to read this but it is just as I find things in everyday business life, and perhaps it may do some one as much good to read a part of it as it does me to write it. At most I hope it harms no one.

Where are the people going to find the general mechanic in years to come? There are no young men learning the trade of the general blacksmith that I know of, and old ones cannot last more than fifty years longer. I wish all members of the craft a prosperous year.

R. N. NORTON, Michigan.

American Association of Blacksmiths and Horseshoers.

Take pencil and paper, brother, and figure out just exactly how much you are making with selling and buying prices at what they are now. Do the prices you are now charging carry their proportion of the expenses and leave you something for living? Do they pay rent, fuel, insurance, new tools, living expenses and the like? Do you think you can go on forever paying the price you do now for material and receive the figure based on costs of a year or two ago? Costs have advanced, brother, and unless your selling price has advanced, too, you are losing money and losing it fast. And prices aren't likely to diminish, so that the need of an advance in selling prices is becoming more urgent every day.

Why not get busy in your county right now? Somebody said at one time "If you haven't an opportunity, create one." The same applies to association matters—if there isn't an association in your county, create one. Ask for my easy plans for forming branch associations, and by return

mail will come my help and plans that have worked with such great success in all parts of the country. You realize the need of better prices the need of coöperation and organization. Then why not start things going in your county? Just address me, P. O. Box 974, Buffalo, N. Y., and do it now before you forget. It will pay you to lay the paper aside for a moment and to address a postal card request to THE SECRETARY.

A Maker of Golf Clubs.

JAMES CRAN.

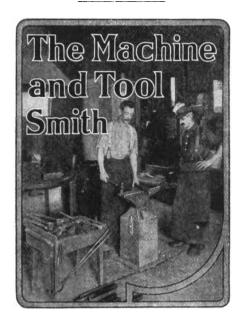


A brief sketch of my experience since coming to this country may interest readers of THE AMERICAN BLACKSMITH. Twelve years ago I came from Scotland, my native place, where I had served my apprenticeship in a small country shop,

shoeing horses and repairing plows and wagons. I learned to make iron golf clubs, and in a short time I got to be quite an expert at that work. On reaching New York the first thing I did was to take in the sights, and on passing Spalding-Bidwell's store on Forty-second Street I noticed in their window some iron golf clubs which I had made in Scotland. I made bold enough to go inside and interview the man in charge, and was advised by him to go to the store on Nassau Street. This I did, with the result that about two weeks afterward I was employed by them for some time in New York. Later I was employed as foreman of the forging, grinding, filing, and polishing departments, which position I held for about four years. When various changes were made at the factory I looked for other employment.

I was among the first, if not the first, to make an iron golf club in this country. Since leaving Spalding's I have stuck closely to machine blacksmithing, finding it more remunerative than the other branches. I worked gradually toward the Pacific coast, where I remained about one vear before I turned towards the East. Four years were spent in moving from place to place. I worked in all kinds and conditions of blacksmith shops. I learned something of value in each of them, and made myself perfectly at home with work weighing anywhere from a fraction of an ounce to a thousand pounds. I have also followed up the treatment of steel hardening and

tempering, etc. Ornamental work has also gained my attention and I have turned out a number of pieces in this line.



Some Pointers for the Machine Smith.

The average machine smith of today serves no time as an apprentice, but picks up a little here and there until he finally settles down in one place, a fairly useful mechanic. Today it is hard to find a good machine smith who is out of a job. We mean one who can pick up a drawing and make a correct forging from it without asking any questions. The chances for learning this branch of the trade exists only in the factories. and there they want the work done, and are not teaching anyone the trade. The best thing for the smith not accustomed to machine forging is to study up on this matter, and if he watches these columns he will find valuable instructions on forging from blue prints, all kinds of tool dressing, tool making, tempering, and case-hardening.

The downfall of some smiths can be laid to their foreman. For instance, if a smith who has not worked anywhere but in a general shop gets a job in a large factory and a drawing for a forging comes from the draughting room, the foreman gives the blue print to the new man, who attempts in a nervous way to do what he cannot, and spoils the job. The foreman then gives it to one of the smiths experienced in that line, and the one who "fell down on the job" does not put in an appearance the next day, but finds a job in a smaller shop, where they do not use drawings. For this reason, machine smiths are scarce.

Now, suppose a drawing comes into the smith shop about like the one shown in Fig. 1. Of course, such a piece as this would be either a drop forging, steel, or malleable casting when called for in large quantities, but, generally, the smith has to make the first one or two in order to try out the mechanism to which it belongs. The detail dimensions are mostly for the machinist, because, if the smith tries to chop out the webs, it is only time lost, as the machinist has to set it up in the milling machine and take a cut off all sides, no matter how good the smith gets it, and it is easier for the machinist to take off a 1-inch stock and he can do that more quickly than he can look for a $\frac{1}{64}$ -inch, and not find it. Now, this kind of a job will confuse any but an old machine blacksmith; he, of course, will know at once what to do. For the new man, whom we are trying to help, Fig. 1 shows two views of the same piece. Now, in the first place, the foreman smith should make a sketch about as shown in Fig. 2 and instruct the

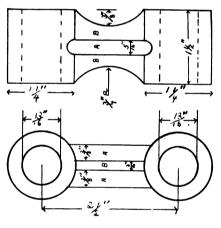


FIG. 1.—THE SMITH MUST BE ABLE TO READ DRAWINGS

smith to leave stock for finishing; then the machinist can get Fig. 1 out of it nicely. The same rule applies to tool dressing and making.

The writer has taken men right from the country shoeing shop, and, after a few weeks of instruction, they have made fairly good toolsmiths. This can be done by making drawings or wooden patterns for him and instructing him how to heat his steel. There is a whole lot to remember in the working of tool steel for lathes and other machine tools.

At this time, let us discuss the side tool, which should be made from carbon or tool steel, instead of high speed. This tool is used mostly for a light finishing out. Now, instead of pounding entirely to shape, it should be forged about as in Fig. 3, and trimmed along dotted lines, thus getting a tool the same as in Fig. 4, which is a side and bottom view. The cutting edge A is a little higher and out

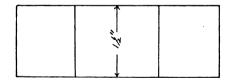
from the bar. This allows the machinist to grind to shape without getting the cutting edge below the bar. Another feature is to leave the tool heavy along back B. This gives it strength. Some smiths make a side tool altogether too light, almost like a cut-off tool, and they break under the least strain. Fig. 5 is a top and end view of a properly made side tool, showing at end view the cutting edge A above and out from bar.

When dipping a side tool for tempering do not get into the habit so frequently followed of dipping, as shown in Fig. 6. This is wrong, for, after you have let the temper run down, you have a little, hard point that will break off easily, giving the lathe hand a number of trips to the toolsmith. This is avoided if dipped as shown in Fig. 7. This operation will give you an even temper almost the entire length of cutting edge, and at the same time leaves the balance of the tool soft. A little painstaking care on the part of the foreman and attention on the part of the smiths under him will result in all the smiths in the shop being able to dress and temper tools equally well.

The Smith and His Work. ROBERT B. KERR. The Forge—Care of the Fire.

The forge is one of the most important articles of equipment in the blacksmith shop.

The fire being the heating medium, on it to a great extent hinges the success of the subsequent operations. It is of the utmost importance: First, that the forge should be of proper construction. Second, that the fire



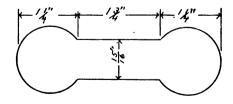


FIG. 2.—THE DRAWING SIMPLIFIED

should be built of a type to suit the class of work being done so as to insure the best results. Third, that the smith thoroughly understands it, and gives it proper care and attention. Fire is a good and willing servant, but a bad master, and it, therefore, behooves the smith as a primary duty to make

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himself master without question, and maintain himself in that position.

To the smith, entering a shop that has forges already installed, the choice of any particular type of forge is, of course, out of the question; he has simply to take what he finds there and make the best of it.

The chief essentials of a good forge, are: a roomy, wide hearth, fire-pot of medium depth; from six to ten inches is about right, according to the class of work to be done; perfectly free air passages, arranged so that the required amount of energy will be transmitted to the fuel without blowing directly upon the work in the fire; convenient arrangements for cleaning, and control of wind pressure. The latter should be maintained at from twelve to sixteen ounces pressure to give the best results.

There are some excellent forges on the market at very moderate cost which fill all requirements, and I would strongly recommend the purchase of one of them in preference to the homemade article.

For small shops, where hand power is used to "raise the wind," the compact, handy, rotary blower attached to the forge will give fifty per cent better results than the old-fashioned bellows. It takes up less room, is easier to operate and heats quicker than the best bellows ever constructed.

If, however, through any cause, the smith prefers to build his own forge the best way to proceed is as follows: Procure a piece of stiff sheet iron, twenty-seven inches wide and of suffi-

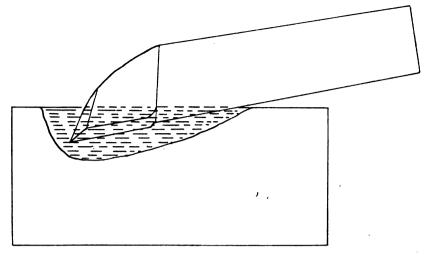


FIG. 7.—THE CORRECT METHOD OF DIPPING A SIDE TOOL

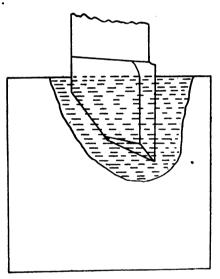
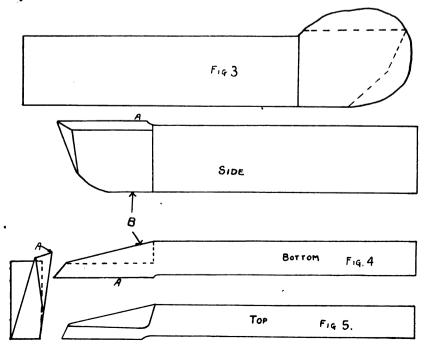


FIG. 6.—DON'T DIP THE TOOL IN THIS MANNER



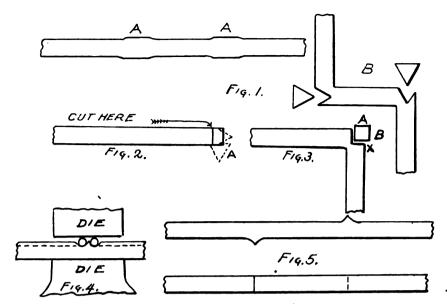
THERE IS A PROPER AND IMPROPER WAY TO FORGE SIDE TOOLS

cient length to form a circle large enough for the body of the forge: about thirty-six inches in diameter is sufficient for the ordinary one. Bend round and rivet together. Take a piece of pipe of from two to four inches diameter. Drill five small holes (about five eighths inch), in it in a circle equal to the diameter of the pipe used; four in the circle, and one in the center; pass the pipe through the center of the forge about eight or nine inches below the top, placing the holes where the fire pot is to be. Connect one end to blast pipe, and leave the other end projecting a few inches beyond the forge and fit with a removable wooden plug for convenience in cleaning. Fill in with brick, flush to the top, using firebrick in the top layers, and line the pot with fireclay.

Some fires have a habit of sucking gas back into the pipe after the blast has been shut off. When the gas explodes it puffs up into the fire, and it is very annoying. It is caused by a partial vacuum in the pipe between the valve and the fire. A small hole drilled in the pipe inside of the valve will effectually cure it.

Many shops are now equipped with the down-draft system. The smoke and gas are sucked down into a tunnel, by means of an exhaust fan, and from thence led to a central stack. The system is excellent where available, but where such is not installed, forges should in all cases be provided with stacks and hoods. The stacks should be large enough to amply provide for all smoke, so as to create a good, free draught above the fire. Stacks and hoods should be suspended at a convenient distance above the forge, so as to be out of the way.

There are many different ways of Digitized by



THERE ARE SEVERAL METHODS OF FORGING CRANK AXLES

building a fire. The writer, in the course of a rather varied experience in this, and other countries, has about tried them all, and for general work much prefers what is known as the "block fire."

Secure a round block of wood about 41-inch diameter, of convenient length, sav eighteen inches and slightly tapered at one end. Set it on end in the bottom of the fire-pot over the blast hole. Have the coals slightly dampened, not too wet, and pack firmly all round the block to the level of the forge. Build up both sides pretty well and, if the work on hand will permit, the back as well, packing the coals with the shovel, leaving all the sides trim and neat, and remove the block.

Start fire with a small quantity of shavings or waste, shovel on some clean, well-broken coke, make sure your fire has started from the bottom, let it burn clear, and you are ready for business. A fire of this description will last nicely through the shift without rebuilding, and will make sufficient coke to last through the succeeding one.

(To be continued.)

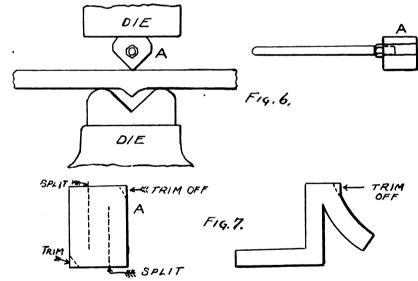
Forging Crank Axles.

JAMES CRAN.

There are several methods of forming the corners on crank axles each of which have certain advantages, but the one to follow for the best results depends entirely upon the equipment of the shop where the work is to be done. What the writer believes to be the safest, easiest and most economical method is to select material of suitable size, cut it in lengths that points where the corners will come when bent as shown, at A. Fig. 1. The

will each make one half of an axle. While straight upset a little at the steel, and to take separate heats when welding, as this will insure getting the wrought-iron, wedge-shaped piece thoroughly heated and welded in the bottom of the notch. The best way of making a dutchman for this kind of work is shown in Fig. 2. After it is drawn to a chisel-shaped point, as shown by dotted lines, it is cut almost through and bent to about right angles as shown by dotted lines A. By this means it can be carried on the end of the piece of stock from which it is made until it has been heated and securely welded in place. The bar is then separated from it by twisting. A second heat, barring accidents, is generally all that is necessary to finish up the corner perfectly solid and square.

An objectionable way sometimes practiced in forging a corner of this kind is shown in Fig. 3. When this method is followed it is almost impossible to make a solid piece of work, as the square piece that is welded in



THE BEST METHOD TO EMPLOY DEPENDS UPON THE SHOP EQUIPMENT

next operation is to bend the piece to about the angle of one hundred and ten degrees as near as possible to the center of the upset. Split with a chisel as shown at B; this will bring the bend pretty close to right angles when the split is opened up. Into the split a wedge-shaped piece, generally termed a "dutchman," is welded. In preparing the dutchman it should be made quite a little larger than the opening into which it is to be welded so that it will fill it up perfectly. Any surplus metal can be removed after welding. When this method is followed it is advisable to use a wroughtiron dutchman, whether the axle is being made from wrought iron or the corner cannot be hammered to preserve its shape, except upon the sides A and B. If A is hammered first, welding commences at X. But when hammering is done at B the chances are that it will again be torn apart at X. In shops, equipped with

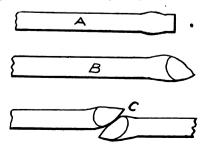
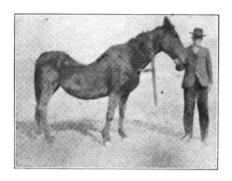


FIG. 8.—THE HALVES ARE THEN WELDED Digitized by GOOGIC

a steam hammer, corners can be made from the solid, by using material heavy enough to allow of the corner being formed before bending. This is usually done by laying two pieces of round steel of suitable size upon the material to be used as shown in Fig. 4,



A THIRTY-YEAR-OLD MARE

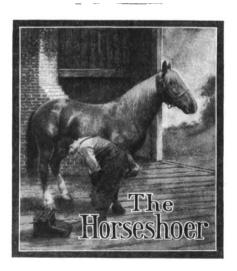
She has foaled thirteen colts, is nine and threequarters inches low in back and can jump any fence on the farm. Photograph sent by Mr. F. W. Wise, of Ohio.

and driving them in to the required depth with the steam hammer. The stock each side of the projection, left between the round pieces, is drawn down to within a little of the size the forging is meant to be when completed. The corner, for the other bend, is formed on the other side of the material in the same manner. When finished it will appear as shown in Fig. 5.

The method of bending is shown in Fig. 6. A V-block, the inside of which is made at an angle of ninety degrees, the top edges well rounded off, is placed on the lower die of the steam hammer, the piece for the corner of the axle placed over it as shown, and forced down until the corner is brought to right angles by placing a tool as shown at A on the top. Admit steam to the cylinder of the hammer and use it as a bulldozer, or it may be done by a series of light blows. By using this method, when possible, an almost perfect corner with a fillet inside can be made. Light crank axles can be made from the solid without the use of a steam hammer by splitting as shown in Fig. 7. When this plan is to be followed it is well to select material wide enough to split into three equal parts, a little heavier than the section of the axle to be made. For a section 1½-inches square, stock one and five eighths inches by five inches should be used, this allows for drawing sufficiently to remove all chisel marks and give the work a finished appearance. Splitting is done, as shown by dotted lines at A. At B is shown the crank partly worked to shape. The dotted

lines across the corner indicate the piece to be trimmed off.

The different methods of forging crank axles here outlined apply only to one half of an axle, as they necessarily have to be made in two separate pieces to facilitate forging and for convenience in machining the journals after they are welded in the center and set. To weld the center of an axle, or in fact any pieces that are to be joined by a plain lap weld, the ends should be upset at least the thickness of the material from the extreme end, as shown at A, Fig. 8; scarfed, as shown at B, and the pieces laid together for welding after being heated to the proper temperature, as shown at C. To upset as at A, the pieces are heated a few inches back from the end, which should be cooled immediately after it is removed from the fire. This causes the metal to swell out just behind the cold portion reducing the amount of work, both for upsetting and scarfing, to the minimum, the greatest amount of metal being at the points where the ends of the scarfs are to be welded in. To do good welding, scarfing is just as important as heating and hammering. B shows the correct form of scarf for lap welding; the point narrow, smooth all over and the center crowning. This brings the centers of both pieces in contact as at C, before the edges or points of the scarf can come together, and insures the center being the first part to be welded. All slag or dirt is thus forced out as welding proceeds.



A Simple Cure for Corns. W. T. CHARWICK.

I have often seen in the columns of THE AMERICAN BLACKSMITH articles from brother craftsmen about cure for corns in horses' feet and often wondered why they have not learned to use a more simple remedy than to use expensive and severe remedies, and thereby injure the vitality of the hoof. I have been in the business for forty-six years. I was obliged to



A BLACKSMITH TOURNAMENT RIDER

give up driving shoes as my back was not strong enough to endure it any longer. I am still doing the other work in the shop. I am seventy-two vears old and still love my trade. I have as good a trade as could be asked for, but there ought to be a shoer in the shop, the place demands a good one. Remedy for corns: Pare out, not too deep. Then after shoe is nailed on take an oil can with turpentine in it and saturate the affected parts. Don't let the turpentine run up above the hoof for it will blister. Repeat this for ten succeeding days. It will cure the worst corns any horse ever had without pain or suffering.

A Blacksmith Tournament Rider.

Mr. George T. Head, of Virginia, besides being a practical smith is also a champion tournament rider. To those readers who are not familiar with the tournaments carried on yearly in the Middle Atlantic States a word of explanation is due. These tournaments are tilting contests. The men are mounted and are armed with a spear or pole with which they tilt at small rings suspended overhead with a distance of sixty yards or less between them. With a flying start each rider drives down along the line of rings and catches on the end of his long pointed lance as many rings as possible.

This, then, is Mr. Head's side-line, and while but twenty-four years old

he has already been very successful in it. He has won a great number of prizes. His mount, purchased with prize money, is "Red Torch," and for a moment. It is one of Asia's peninsulas lying next to Africa. It is about one thousand eight hundred miles long and six hundred miles wide,

cords at the rear of the leg, as heretofore described, are to my mind very important for the shoer to know about. First, the almost universal custom





RESIDENCE OF MR. GROVE. HIS ELDEST SON IS AT THE REINS

THE GENERAL SHOP OF MR. E. L. GROVE OF PENNSYLVANIA

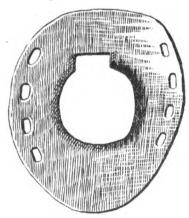
recently won second place in the races held in his district.

The engraving shows Mr. Head in tournament costume. Some of the "knights," as the tournament riders are known, affect spectacular costumes and trappings, but Mr. Head will have none of these and enters the lists clad only in ordinary street attire. Mr. Head is an expert horseman, has a quiet, calculating eye, a steady arm and hand, and is a champion among the tournament riders of his district.

The Arabian Thoroughbred Horse.

A. F. LIBBY.

The thoroughbred horse is one of which a clear record has been kept of its parentage on both sides for at least five generations. It is claimed



A MODERN ARABIAN HORSESHOE

the Arabian horse is the source from which the race horse sprung. The Morgan horse is a descendant of the Arabian and so are many of those of Kentucky. Let us glance at the Arabian country and has about five million population. About one third of its land is sandy desert, and nearly one half of the population live in tents. They have their summer and winter camping grounds. Some of the Arabian tribes are very large. The tents of one tribe, of which I have record, covers twelve acres of ground. They own many thousands of horses and sheep. The Arab has three breeds of horses: an inferior breed which is of little value: an unknown race or half-bred horse, and the Kochlani, of which they have clear records for hundreds of years. In the horse markets of that country the animals of this class when sold bring from seven hundred and fifty to one thousand dollars The Arabian horse is noted more for its endurance than for its speed. I have records of one being driven one hundred miles in seven hours.

The Arabs were among the first to shoe the horse. They use a shoe something like our bar shoe, only very thin, with large-headed nails which take the place of calks. No people think as much of their horses as do the Arabs. Some will not part with their horses even at large price.

Lame Horses and What the Shoer Can Do For Them.—3.

E. H. MALOON.

In our last article we looked at the coronary band and coffin bone in what we had to say on contraction. In this article we will look at the laminae. This is a tough, elastic tissue that joins the shell to the coffin bone. Here lies the trouble when a horse founders. Now, the laminae and the

is to shoe a horse with a high calk. I want to ask you right here to look at the shod horse as he stands on the floor and tell me what is holding up two thirds of his weight. It is not the sole and frog, for you have removed this from the floor and it has no support whatever from the outside. Therefore, the whole weight comes on the laminae and the cords that are fastened to the coffin bone. which causes them to carry more than nature intended. Now, if the foot is set up on rugged lines and the horse has strong laminae, he stands the treatment for some time, but if the foot is weak and the laminae likewise weak he soon goes lame. What makes him lame? I will tell you as I see it.

First, this laminae gives out, the foot settles and you have a convex instead of a concave foot. Undue strain is brought on the cord that is at the rear of the leg, inflammation sets in, and the horse is lame. My best remedy is a thin shoe. Take an old shoe, draw the heels very thin and fit as large as the hoof and no more. This shoe gives a good frog pressure, divides the pressure on the sole, and gradually the internal structure goes back up in the shell and the horse goes sound.

If this shoe cannot be used the next best thing is a har shoe and frog pressure. Have the bar wide and stiff, and give pressure enough to gradually push the structure back where it belongs.

The condition above described is exactly what happens when the horse is foundered. Only this difference in founder: The laminae is entirely

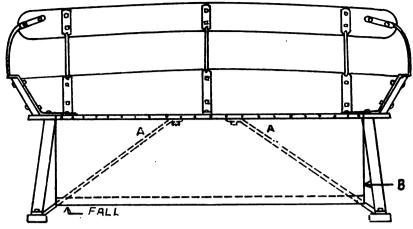


FIG. 2.—SHOWING DETAIL OF AUTO SEAT

destroyed, if the horse is not doctored, but if the horse is taken in time his shoes taken off and his feet pared. so as to give good pressure to keep the foot from settling, medicine given him, and also applied to his feet to allay inflammation, the horse will come out in fair condition. But when founder has run undisturbed the laminae is entirely destroyed and his foot becomes deformed, caused by the settling of the internal structure. To my mind the horse is almost worthless, but we have to shoe him, and I know of no better way than a long bar shoe with a wide bar made heart-shaped. Keep his toes cut back, put on a low toe calk and fit his shoe with a frog pressure, but no pressure on the sole. Put a pad under the shoe made from a double belt, use cotton or oakum in the clefts of the frog to keep out the sand, use plenty of pine tar to keep soreness out and you have done all you can to keep the horse in condition to do his work.

Here I will give you a bit of experience that came to me the other day. We have a man who travels up and down the State doctoring horses. He tries to do things that are not laid down in the books and are not recommended by the college veterinary as practicable. One of these things is making dropped-soled horses go sound.

One day last week he came to my shop with a patient. This patient was a foundered horse from Boston. The horse had been attended by a good veterinary there, and finally sent up here as no good for work there. The horse had been here more than a year and the case had become chronic. His coffin bone had gone down and forward, his toes turned up and he traveled on his heels. This man took a rasp and filed a groove in the animal's hoof at the angle where the hoof started to grow horizontal instead of perpendicular. He then spread the bottom of his foot with tar and taking a hot iron he seared the bottom of the foot. This he did several times. He then put on a shoe called an openbar shoe, that is, the heels were drawn thin and bent around on to the frog. Now, all this would do the horse no harm, but I fail to see how it would restore the laminae and make a sound (To be continued.) foot.



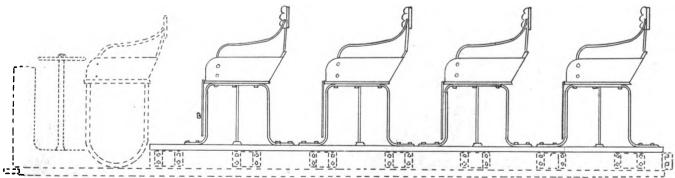
How We Converted a Freight Truck into a Sight-Seeing Car.

NELS PETERSON.

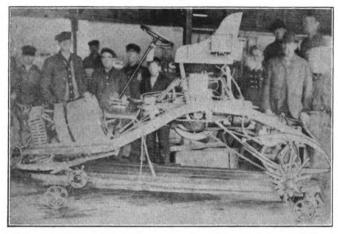
It appears from observation that the auto is rapidly replacing the horse-drawn vehicle in all lines of business, not only for carrying passengers but as a freight-hauling device, and it is said by those who use it that it is possible to handle a greater amount of goods during a day with the automobile than can be done with a team of horses and wagon, owing to the rapidity of motion. Thus it is claimed that two men with

an auto truck can accomplish one third more in a day's work than they could with a team and wagon.

Not long ago a transfer company of this city, who own several machines, hit upon the idea of utilizing them for other purposes than hauling freight and they accordingly had two of their auto trucks converted into passenger cars for picnic and sight-seeing parties. The truck was easily converted by removing the stakes and putting on the seats, as shown in engraving, Fig. 1, which is a side view of the seats. Two wooden rails are laid along the edges of the



SHOWING ARRANGEMENT OF SEATS, WITH ORIGINAL TRUCK IN DASH LINES



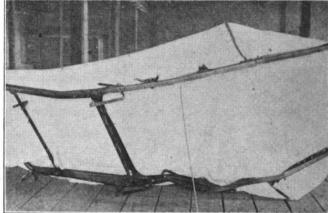


FIG. 1.—THE TIRES AND RIMS WERE TORN AWAY

FIG. 3.—THE FRAME WAS ALMOST KNOTTED

body, and onto them are bolted the seat risers which are made of 1½ by ½-inch iron. The seats set directly on top of the risers. Two braces are run from the rails to the bottom of the seat in a slanting position, as shown at Fig. 2, to keep the seat from swinging sideways and tearing loose. A leather fall is hung from the front of the bottom seat, as shown at B, Figs. 1 and 2. A couple of bolts through the body and rails keep the seats from sliding off. When it is desired to again use the car for hauling freight the bolts can be taken out and the seats removed and the stakes put back in their places

This same machine attempted to knock a street car from the track, with the result that it had to be hauled to the blacksmith shop. Upon inspection, it was found that the angle irons constituting the frame of the auto gear, were badly twisted and bent. The front part of the body had also been fractured and smashed in. The boss blacksmith expressed doubts as to whether the angle irons could be straightened so as to be of any service again, but it happened that the writer had read up on automobile repairing in THE AMERICAN BLACKSMITH. I am not in the habit of turning down a job simply because it can't be done, so I informed him that I could straighten it and make it as good as it ever was, and I did. The repairing of the parts damaged involved a considerable amount of labor as all rivets

and bolts in the frame had to be removed to enable us to handle it and get it into the fire. I may state that to straighten the angle iron which was both twisted and bent in several directions I found

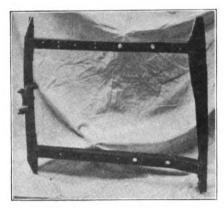


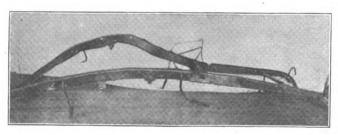
FIG. 4.—THE SUB-FRAME WAS VERY SLIGHTLY BENT

it convenient to heat it and fasten it in the vise so that it was possible to pull it into shape so nearly true that but little hammering was necessary. Of course, each kink had to be treated separately in this manner and when the operation was finished it was taken to the face plate and all small kinks straightened out.

The Automobile and the Freight Train.

On the testing track of one of Michigan's large auto factories the other

day a tester was crossing the sidetrack of a railroad and did not notice until too late a train of freight cars backing down upon him. The end car struck his rig "amidship," as a sailor would say, but did not hurt the driver of the auto in the least. He was thrown under the shipping dock out of way of harm. The auto was rolled and tumbled along the track for about fifty yards before the engineer stopped his train. By this time the auto was a total wreck. In the accompanying engravings are shown what was left of the auto. Figure 1 shows it as it was taken from the track. It had to be run in on trucks, as you will notice there is not a spoke left in any of the wheels, but the testing seat is intact. The gasoline tank, water tank and cooler are a little the worse for the accident, but are still on the job. Figure 2 is an edge view of the frame. Notice the toe-board iron and step shanks, also the lamp brackets. In Fig. 3 is shown a top view of the frame. You will observe the lower side is almost tied in a knot. Figure 4 shows the sub or motor frame and except for a slight twisting has not fared so badly. The front axle is shown in Fig. 5. This is almost beyond repair. It could be put back in shape, but the cost of doing so would buy two new ones. Altogether, the accident was remarkable in that the driver escaped injury.



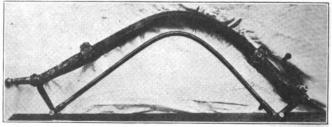
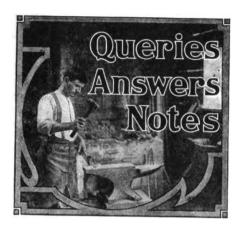


FIG. 2.—A SIDE VIEW OF THE AUTO FRAME

FIG. 5.—THE FRONT AXLE WAS BEYOND REPAIR



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wage Earner or Shop Owner.—I would like to have the following question answered. Is it better for a man to work for wages by the day than it is for him to own and control his own shop? H. B. Goodwin, Missouri.

A Redwood City Brake.—Can some of our California friends tell us how to make a Redwood City Brake. I made some of them years ago but have forgotten the plan and dimensions. A. C. SAMPLE., Colorado.

Forging Malleable Iron.—In reply to H. H. D., of Illinois, who asks about forging malleable iron and cast steel, I want to say that I use Cherry Heat Welding Compound successfully in welding the above metals.

BEN HARNISH, Iowa.

A Question for Mr. Wilson.—I would like to have Brother Wilson give me a description of the two beautiful ornamental pieces which he made and which were illustrated in the December Ornamental Iron Number.

E. A. Blum, California.

Removing that Stuck Pulley.—In January, G. H. asks how to remove a pulley from a shaft. In reply I say to put pulley in fire and heat rim and hub very slowly when it may be removed by light blows. Do not hit the shaft.

B. HARNISH, Iowa.

Can You Beat This?—Your paper is fine and has many good things for the man that is looking for information. I started at the trade the first day of 1881 and have not been away from the fire four months in that time. On Saturday I drove one hundred thirty-six shoes from 6:30 to 4 α'clock. How is that for my age of fifty-two years?

W. M. Deremer, Ohio.

What Say You.—The January number of "Our Journal" at hand, and looked over. I notice that P. J. Collum, of Iowa, wants to know what we think about having the "Journal" published twice a month. What do you say, Mr. Editor? I, for one, say let us have it twice a month. Could you give us the same kind of goods as you have been giving us for, say \$2.50 a year? Let us have an idea from the rest of "Our Folks." E. S. POTTER, Pennsylvania.

From Missouri.—I have a small shop and work by myself most of the time, sometimes have help. I do a great deal of work of all kinds. I have a gasoline engine of three horsepower, also a trip hammer, drill,

buzz saw, disc sharpener, grindstone, ice cream freezing machine and emery wheel. I use my drill for boring my wheels when I fill them. I like The American Blacksmith and get plenty of good information out of it.

B. A. Van Bibber, Missouri.

A Letter from Iowa.—I find your paper very useful for any blacksmith or wagon maker. The different ideas from all over the country make it very interesting. I have been working here ever since 1879 and find that there is still lots for me to learn. We get very good prices for work and have one price for all, and won't work for anything less. We have a very nice shop, are proud of it and take delight in keeping it clean and up to date.

H. M. Hughes, Iowa.

How to Set Plow Beams.—In December, V. H., of Washington, asks in regard to setting plow beams. First, set your plow on the level floor, then the front end of beam should measure fourteen inches from under the end of beam to floor for fourteeninch plow and fourteen and a half inches for a sixteen-inch plow. For steel beam heat back about a foot from front end and spring down to required point. The beam should also run to the right about two and a half to three inches lined up with the land side. This wings the nose to land for both wood and iron beams. Ben Harnish, Iowa.

A Question On Shoeing.—I have a mare to shoe. She has a flat foot, but a good foot and rim. She travels good barefooted, but as soon as she has been shod a week she gets stiff. I would like to know how to shoe her so she can travel when she is shod.

George G. Campbell, Idaho.

In Reply.—If Friend Campbell has not tried a light bar shoe with a leather pad I think he had better do so. Judging from the few facts he states I think he'll find the above to fix the mare in good shape. There may possibly be some other conditions, not stated, which should be considered.

W. O. Julius, New York. A General Shop of Ontario.—The accompanying engraving shows my shop which I built in 1907. It is built of clay brick about the size of cement block, and is seventy feet long by twenty feet wide. The front fifty feet I use for a shoeing and jobbing floor and the back twenty feet for a wood shop. I keep two blacksmiths besides myself, and a woodworker and painter. We do nearly all kinds of work, but mostly horseshoeing. I have not any power in yet, but am thinking of putting in a gas engine soon. The best machine I have in the shop is a House Cold Tire Setter, I set nearly five hundred tires with it during the last year. EDGAR VINCENT, Ontario.

Mr. Miller, the other smith, and myself get these prices. One of the other shops is run by a Pole and he shoes for one dollar for all sizes of shoes and forty cents for resetting. The other two shops charge a dollar and a quarter for new shoes and fifty cents for resetting. The other is a

jobbing shop. Three shops did all the work here for years. W. R. Miller is the oldest man here; he has been here twenty-two years and I have been here nine, and the rest have all come in the past two years.

E. W. Smith, New Jersey.

From Tasmania.—In one of your recent issues were the drawings for a shopmade power hammer. These I have acted on and before I got the next issue I had it at work. I have a fifty by twenty-five shop, one fire, two helpers, a band saw, an emery stand, a rip saw, a drill, a blower, a Little Giant punch and shear and the hammer before mentioned. All of this machinery is run by a three-horsepower I. H. C. gas engine.

I was the first in this State to put a gas engine in a smith shop, and I am pleased to state that it pays big profits. Of course, we have to pay just about three times the cost of fuel that our American brothers do and prices for work are about the same as the average published in your paper. This is the center of a copper-mining country, consequently, plows are not called for.

C. H. STITZ, Tasmania. An Interesting Letter from Ohio.-I read "Our Journal" with eagerness and find many bits of information not only in one branch of business but all are equally interesting. I am sixty-three years old, have always been in carriage work at this place except eight years as postmaster and two years in the army. I was a bugler under General Phil Sheridan and a prisoner of war in Libby prison. I am now a fifer with the Civil War musicians. Have been leader of a cornet band for seven years, member of Council, president of the schoolboard, mayor for six years, and am a member of the Odd Fellows, Masons, G. A. R., and Junior Order. I have been a newspaper correspondent for twenty-six years. My carriage shop is brick and frame, one hundred by twenty-three feet, two stories high and I rent a showroom be-



A GENERAL SHOP OF ONTARIO

sides. I have a four-horsepower Foos Engine to run a drill, emery wheel, circle saw, boring machine, and grindstone. I make new work to order and do all kinds of repairing. I can paint, trim, and do woodwork and blacksmithing. I work five hands in the busy season. I like the carriage business and often think of the old proverb, "Keep thy shop and thy shop will keep thee." Thomas B. Jobe, Ohio.

More About Axle Lengths.—The illustration of my gauge in the November issue, page 47, was correct, but the explanation of the measurements was incorrect. Instead of "measuring four and three quarter inches from top of rim to gauge" it should read "from top of spoke close to the rim."

To get a plumb spoke on the wheels with the measurements as I gave them would require a set-under of each wheel of one and one fourth inches or for the two wheels two and one half inches. The added length of one and one fourth inches would be five eighths of an inch on each side. In throwing the wheel under five eighths it also throws the top out five eighths, making one and one fourth inches. I always make spokes plumb that have a little dish from the front, as the use of the wagon keeps a pressure slightly under or back, thus preventing the use of the wagon from working more dish in the wheels. JOHN A. SCHULTE, Connecticut.

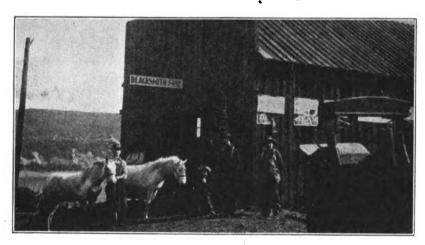
Licensing Horseshoers.-I will drop a few lines in reply to C. C. Richer in the December number of THE AMERICAN BLACK-SMITH in regard to licensing horseshoers. It would be of no benefit to the horse or horseshoers, as it would shut out no one. no matter how incompetent, as long as he had the license fee to pay. Such a law will only provide for an extra tax on the poor smiths and horseshoers, and their chances for making a living will not be bettered any. What is wanted is a board of examiners and every man be compelled to take an examination on shoeing and anatomy, and no board of examiners should allow any horseshoer to pass an examination just because he can answer the questions put to him in regard to anatomy of the leg, for anybody can learn the names of the bones and tendons in a couple of hours We have such a law in our State, but it applies to the large cities only. Let it be applied to every shop in the State that does J. A. B., Minnesota. shoeing.

nails. We use almost as many old shoes as new ones. I sold old shoes the other day amounting to over four tons, the number I removed in 1908, for forty cents a hundred. I have colored opposition across the road from me who shoes for twenty per cent less than I do. I have a good smith now who is from Europe. If business continues to increase I will put in an engine this spring. We haven't many bad horses here and don't let any go out without shoes, for we use the old Kentucky style, main strength, and that's the best.

J. B. FORD, Kentucky.

A General Shop of Washington.-I will have been in business here two years on the 15th of March, 1909. The stack of horseshoes shown I have accumulated in that time. I do all kinds of repair work, from a buggy to a steamboat, and do some automobile work. I have not got my shop fully equipped yet. I use gasoline power to run my drill, emery wheel and saw and expect to put in a lathe in the near future. I run two fires and keep one man busy beside myself all the time and two men part of the time. I carry my own stock of iron. shoes, wood and in fact everything as near as I can. I carry about a \$3,000 stock. My shop is twenty-four by seventy feet. O. B. MAPLE, Washington.

A Minnesota Shop.—The accompanying engraving shows my shop which I think is the best in the State. I do horseshoeing and repair work. I pride myself in four things; first, as having the best and cleanest shop; second, having the best equipment; third, having the largest stock, and fourth, doing the most work with the least help of any shop in this State. The first second and third tells the tale of the fourth. First, by having a tidy shop no time is wasted looking for tools, etc. Second,



A GENERAL POWER SHOP OF WASHINGTON

From Old Kentucky.—As I have never seen much about the Kentucky blacksmith I want to get acquainted with all. I am the blacksmith of a village of about eight hundred inhabitants and have been taking The American Blacksmith for a long time. I have been in the business for over forty-five years. I am past sixty-three years of age and have a smith and helper, also a floor man. I do all the woodwork myself. My books show that we have nailed four tons of new horseshoes in 1908 and drove over three hundred pounds of N. W. horse

doing work with power tools means more work with less labor. Third, by having a complete stock no time is wasted in remodeling, which means a saving of time and material. I might add the fifth by saying I read The American Blacksmith, which I think is the best Trade Journal published.

Joe Lamon, Minnesota.

From Far-away Australia.—I have been a subscriber to your Journal for about twelve months, and although a busy man I wish to express my admiration of your valuable paper. Blacksmiths as a rule



A MINNESOTA SHOP WITH POWER EQUIPMENT

are not easily drawn into print, but it is good practice if one could only realize it. Personally, I am delighted with the tone of your Journal. Many of the articles are elevating, inspiring and instructive, and its influence is for good. It is pleasing to note that our truest and best tradesmen uphold the dignity of labor by demanding a living price for their labor, for it is rare cases where we receive anything for "knowing how." We, in Queensland, make a great cry of "White Australia." but we are not "out of the woods yet." We have our "cut-throats" and "cheap Johns," who are, nine times out of ten, poor tradesmen, if indeed they can be called tradesmen at all. Organization is the order of the day, or at least appears to be, judging from newspaper reports. Since the Wages Board Bill was put on the Statute Book of Queensland even the coach builder and wheelwright are talking of forming an association in the City of Brisbane, and I hope it will continue, as this appears to be the only means by which honest men and tradesmen will get their rights. ROBERT LANG, Australia.

Power-Price-Cutting. — I have a three horsepower gasoline engine and find it a great help. The smith who has not got any power in his shop does not know how much it is worth. I have a band saw, an emery wheel, a rip saw, a cut-off saw, a turning lathe and a boring machine. I made all the frames for my saws and also made a planer which works like a charm. I would not work without power in the shop. I can do much more work and do it so much easier. To the smith who intends buying an engine let me tell him to buy it as soon as he can and to get one large enough. If you use it right I don't think you will ever feel sorry for buying it.

Of the price-cutter let me ask why do you cut prices? If you have anything to give away—give it away, but don't cut price of work. It doesn't profit you as you think it does. Then why not do good, honest work at an honest price? When a customer asks you what you want for a certain job, quote him a fair price. And if he says that so-and-so will do it for less, tell the customer that you don't belong to that class. I would rather be out of business than to be a price-cutter in pusiness. And, then, too you'll find that most of the price-cutters are "botchers." Be a live smith, do honest work and get honest pay.

A Question on Patent Law.—I would like to know something about a patent. Can anyone do anything with a patent just issued on a thing that has been in general use for the last thirty-eight or forty years, upon which no improvements have been made? Will this patent hold good? I have reference to a patent on bobs or sleighs. I

front we occupy as the blacksmith shop. We have three forges equipped with sixteeninch blowers. We work three first-class smiths and make horseshoeing a special feature, having a large amount of shoes always ready to drive and never keep a customer waiting. Forty feet of the rear of the shop we use as a wagon and repair

W. H. HOOVER S. CO.
W. H. HOOVER S. CO.
WAGON MAKERS AND BLACKSMITHS.
PRACTICAL HORSE SHOEING
A SPECIALTY.

WAGON MAKERS AND BLACKSMITHS.

WAGON MA

CONCRETE IS EXCELLENT FOR SMITH-SHOP BUILDINGS

have built them for twenty years and they have been in the West and throughout the northern part of this State. The inventor claims them as his improvement, but he has made none. YORK STATE READER.

In Reply.—More than two years' public use or sale of an invention prior to the date of application for patent will bar the grant of a valid patent for said invention. It is therefore obvious that if a patent has been recently issued, as your correspondent states, on a structure which has been in general use for thirty or forty years, such patent would be invalid

If the issued patent discloses the old or original invention, and actually covers an improvement, it would not serve to revive the old patent. When a patent has expired the subject matter thereof becomes public property. The term of a patent can be extended only by special act of Congress, and extensions are exceedingly rare.

It is quite common for patents to be issued for specific improvements in structures which are broadly old, yet the patents for the improvements are entirely valid and in many instances prove of great value where said improvements effect a new and useful result and thereby constitute the invention as improved, a superior article from a commercial or industrial standpoint.

It would be well for correspondent to definitely ascertain whether or not the patent in question is directed to the specific structure which he is manufacturing. It may be found that the patent simply covers improvements, but in that event it would certainly not be effective in preventing your correspondent in continuing the manufacture of the old and well-known structure.

R. S. & A. B. Lacey, Washington, D. C.

A Concrete Smith Shop.—We just recently built this new concrete block shop, thirty by one hundred feet. Sixty feet of the

shop; here we work one or two first-class wagon makers, do repairing promptly and make new work to order. We use nothing but the best material obtainable and guarantee all work turned out of our shop, and with our fast increasing trade we expect to double our capacity within a very short time. We must say for the "Journal" that the information we gather from it is indispensable. We find almost every kind of material we use advertised, and the correspondence generally is very instructive. We could not successfully get along without "Our Journal."

W. H. HOOVER & Co., Maryland.

An Interesting Letter.—I am a new subscriber to "Our Journal," but every time I look over its pages of valuable informa-

tion I am more convinced of its usefulness to the craft. I have hoped to find a letter from some brother in this section but have been disappointed.

This is a small town of about three hundred people, but what we lack in quantity is made up in quality. The Tennessee Valley at this place is twelve miles wide and this town is half way between the mountains and the river on the Southern Railroad.

My shop was built twenty-two years ago by the best all-around mechanic in Northern Alabama. He died four years ago. I have owned the shop for a year and have made money every day. I am a cabinet maker by trade and never worked a day in the shop until I came here, but by using common-horse sense with what information I could gather from books and my fellow craftsmen I have unraveled some of the knotty questions that confused my old blacksmith. I was very much interested in the articles written on horseshoeing in the August journal and have profited by them. I have read several articles on how to make a wooden wagon axle for thimble skeins; now, will some brother tell us the rule for getting the length of an axle for the different sizes of wagons, also for getting the proper shape of spindle for wheels of different dish.

My shop is equipped with steam power one twelve-inch jointer, one twelve-inch circular rip saw, one ten-inch cut-off saw, a jig saw, a turning lathe, a drill press, a hot-tire shrinker, a tire bolter and shears, two forges and four vises convenient to the forges. The blacksmith shop is thirty-three by thirty-three feet, wood shop is twenty by thirty-six; office is twelve by twenty with an upper story over the smith department, all under one roof.

I carry a line of building lumber in addition to my stock of hardwood, also hardware, paints, oils, glass and roofing material. I am agent for the International Harvester people and sell lots of their product. My advice to all blacksmiths in small towns is to carry a paying side line. Prices are fairly good here and money plentiful for the fellow who works for it. If some honest, sober, industrious brother



A TRANSVAAL (SOUTH AFRICA) SMITHY, WHERE ALL KINDS OF GENERAL WORK IS DONE
Digitized by

is dissatisfied with his location and wants to invest \$2,500 in a business that will pay twenty-five per cent on his money I will sell him half interest and guarantee his money back in four years.

JAMES J. CHALLEN, Alabama.

How to Dress and Temper Rock Drills.—
In the December number Philip Shimmin,

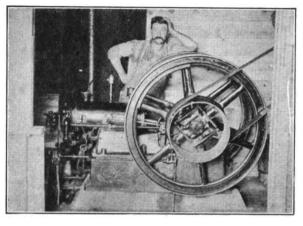
It will take a little practice to get the heat-just right, but don't give up until you have it perfect. No doubt information from other brothers will be given, but this is the method I learned and have stood by for eight years. I am still learning a good deal through The American Blacksmith.

WM. Anderson, California.

In reply to Mr. M. S. C., Washington, on tempering wood-cutter knives, I would refer him to the same bath, except just one half the ingredients to the same amount of water and heat the bath as before. To heat your knives get a good bed of coals and lay a piece of sheet iron over the fire, leaving plenty of space between fire and plate to



MESSRS. PARKER AND CLARK, OF INDIAN TERRITORY— BUILDERS OF WAGONS



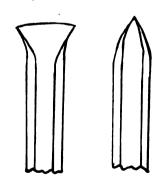
MR. H. B. BERGSTRESSER, OF PENNSYLVANIA, AND HIS POWER PLANT—AN EIGHT-HORSEPOWER GAS ENGINE

of Idaho, wants to know how to dress and temper rock drills. As I am a tool sharpener by trade I will give my method. In sharpening hand steel I make the bits very slightly curved on the edge. Don't hammer the steel back, but draw it out till sharp; and don't make a bevel on each side, but let it gradually curve to an edge, as in the engraving. You can make quite a thin bit that will stand as good as thick ones if you get the right temper, and it will naturally cut more ground and it is easier for the men to use. Work while the steel is hot, sharpen with as few hammer blows as possible and never hammer after the steel gets cool and lay the steel in a dry place to cool. When sharpened make a clean, wide fire; place three or four drills in at a time and heat slowly for about one and a half inches back to a nice red and dip for an inch in water that is not too cold, moving the bit back and forth till it is cool enough for the remaining heat to draw the temper to a straw color; then plunge the steel in water to cool. Rub the bit with anything that will polish it so you can see the temper run down. I use a one by twelve-inch board with little coal ashes on, and two strokes with the drill on this board is sufficient, the board being nailed on one end of the slack tub. it also for a shelf for laying the drills on when watching the temper run down. Keep a good gauge on the bits and use good judgment in tempering and you will find your drills will come out all right. Never overheat your steel, but remember the more careful you are about heating the better the results will be.

In sharpening Burleigh drills I make the bits, which are cross-shaped, straight across and gauge them three sixteenths of an inch to every foot. In tempering them I give the same careful heat as the hand drills, but as short as possible, and turning very often makes it nice and even. As soon as the right heat is obtained take out and plunge slowly in water, not too cold, and it will be a good, tough bit.

Answers to Several Questions.—As I look over my "Journal" and read the questions and answers I notice that several are in need of information on different subjects, and I will try and help them out.

In reply to Mr. Philip Shimmin, of Idaho, on rock drills. He wants to know a method of dressing and tempering. I would call his attention to the first step, as we call it, and that is use little fire and more hammer. He should just heat his steel first to a good bright red and draw quick; then to finish, heat to a good cherry red and hammer light and fast, but don't hammer after the steel turns black or you will injure the steel. It is better to reheat if you cannot finish at the one heat, but bear in mind to heat slowly



HOW TO DRESS AND TEMPER ROCK DRILLS

and not above a dark cherry red. When done, reheat and lay in the ashes on the forge and let it cool. Then reheat slowly until it is a very dark red and cool in warm water. Grind and heat to a medium cherry red, harden and draw to a straw color. For the hardening use one half pint of table salt, two ounces of saltpeter, one half ounce of alum, two ounces of sal-ammoniac to a gallon of water and heat the bath to about ninety degrees, that is, about blood heat. I think that if the brother will follow this method he will have good results.

handle your knives; then turn on just enough wind to raise the straightest blaze and to heat the thick part of the knives first, and don't allow any part to reach above a cherry red. If any part turns white when cooled in bath the steel is too hot. If you get it an even heat and plunge it into this bath and draw to a straw color you will have no trouble. But here is another point that many a good smith docsn't know and is what cracks more tools than the bath and this is; they will plunge the tool in the bath and take it out while some part is yet hot and it will crack and they will lay it to the steel or bath, when it is neither one nor the other. They are themselves to blame. Bear in mind when you plunge the tool in the bath to let it remain until it becomes of the same temperature, then remove it and there is no danger of cracks. I would advise the reader to take a piece of steel and grind it as he would for a tool and try it a few heats to satisfy himself as to the condition he must have his fire and to get the proper heat, as we all know that practice makes perfect.

The length of axles. I see in my December issue of The American Blacksmith that Mr. A. E. Carr, of New York, cannot see how Mr. W. H. carries the idea that a hind axle has to be longer than a front one in order to make them track on a plumb spoke, nor do I. I would like Brother W. H. to take the front axle and put on two 36-inch wheels with the same dish as the fore wheels and measure them. I will venture to say that it makes no difference at all with the size of the wheel if the fore wheel has 1-inch dish and the hind a 1-inch dish. They are bound to measure the same on the axle, and he cannot get out of it for a box of cigars. I have worked at wagon work a little myself in the last twenty-seven years. He has undoubtedly got the axles mixed. a 31-inch axle is longer than a three-inch axle; that probably is where he gets the difference. I would like to hear from him C. W. METCALF, Iowa.

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Made in all regular sizes, and in the new 18-inch Slim, which gives the user the advantage of a long stroke, and at the same time a rasp of medium weight.

ASK YOUR DEALER FOR THEM

Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, March 1, 1909, and are subject to fluctuations. Corrected for The American Blacksmith by The National Heavy Hardware Reporter,

Correspon	dente	report	no chang	es in prices	
COFFESSION	шешк	rebort	TIO CHAILE	es in Drices	١.

correspondents report no changes in price	٥,
Horse Shoes— All Iron Shoes Steel Shoes. No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more	\$4,40 4.25
than one size in a keg	
Mule Shoes	4.90
Featherweight Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
1.1-1. Company by	
Ideal Countersunk	6.00
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
Track Weight	9.50
E. E. Light Steel	5.50
Steel Driving	5.50
O O Mula Obassa andre	
O. O. Mule Shoes, extra	1.50
Merchant Bar Iron— \$1.90 to \$2.10 rates full extras, and 20 cer	nts per

100 pounds extra for broken bundles.

Steel Bars— \$1.90 to \$2.10 rates, full extras.

Toe Calks-	-			Per box
Blunt Sh ar p			 	. \$1.30 . 1.55
Carriage Bo	dts—			
6 x 1 and Larger as	l smaller nd longe:	r	 	.60-10°;
Machine Ro	He			

4 x f and smaller	60- 10°? 50 %
Nuts— Less than 10 lbs. of a size	\$2.50 off

Washers— Same price as nuts.	Skeins— Cast 65%
Maileables—	Half Patent Axies —

Springs

Single Spring. each	\$1.25 .06
Hickory Lumber—Per Foot— 1 to 2\(\frac{1}{2}\) to 4\(\frac{1}{2}\).	\$.09½ .11
Ash and Oak Lumber—Per Foot— 1-11	\$.081 .091

Yellow Poplar Lumber	-Per M.	Feet-	
		13 to 17	18 to 24
# <u>"</u>	\$65.00	\$65.00	\$75.00
<u> </u>	65.00	68.00	80.00
1"	68.00	75.00	85.00
[]	72.00	80.00	104.00
Rough Hickory Axles-	_		Each.
3 x 4 6 ft			. \$.60
31 + 41 R ft			1.00

3 x 4	6 f	t	•••				 										\$.6
31 x 41	6 f	t.					 										1.0
4 x 5	6 f	t.					 										1.20
5 x 6		t.															2.20
4 x 5	64 f																1.30
44 x 54	6 a																2.00
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Rough Oak Bolsters— Short	
Finished Oak Bolsters— 2‡ x 3‡ and under	\$.65

	ak Wagon Tongues—	
3 x 4	and under	\$.65 .70

Rough Oak Wagon Tongues— 4 x 4 x 2 x 4 x 12 and smaller	. \$1
Finished Oak Wagon Tongues—	21
31 and smaller	

Two Inch Sawed Hounds	E	er Pair.
Tongues		\$.40
Front	• • • • • • • • • • • • • • • • • • • •	45
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Patent Wheels-	• • · · • · · • • • • • • • • • • • • •	
A. B. No.13 and under.		40 %
D. No. 12 and under .	· · · · • • · · · · · · • • • • • • • •	
D. No. 13 and under	· · · · · · · · · · · · · · · · · · ·	_30 %
All Grades, No. 17 to 33	• · · · · · • • • • • • • • •	35-0 %
All Grades, No 39 and L	arger	20 %
C. No. 13 and under	<i>.</i>	35-5 %
Cupped Oak Hubs- Set. I	Plain End Oak H	ubs-Set
7 x 8 x 9 \$1.10		\$2.90
	11 x 14	3.60
	11 x 15	4.00
8 x 10 x 11 1.50	11 x 16	4.50
9 x 10 x 12 1.70	12 x 16	5.00
$9 \times 11 \times 12 \dots 1.75$	12 x 17	5.50
$10 \times 12 \times 13 \dots 2.60$	13 x 18	6.25
11 x 13 x 14 3.65		
12 x 14 x 15 4.50		
Rough Sawed Felloes-		
11 x 2 " \$1.55	2 x 2½"	. 2.00
11 x 21" 1.75	21 x 2	
1 x 2 f 1.85	3 x 3 "	. 5. 75
3 x 31"	. 6.00	

14 X 2 " \$1.55	2 X 24"	2.00
1 x 2 1 1.75 1 x 2 1 1.85	21 x 2 3 x 3	4.75
14 - 24" 1.85	3 + 3 "	5.75
3 x 3 1	6.00	0.10
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Ironed Poles. White, XXX-		
1 x 2 1 No. 2		\$4.00
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2 x 21" No. 3		4.00
Ironed Shafts. White, XXX-		
14" x 2 " and smaller		\$2.15
1 x 2 ·		2.35
1½ x 2¼"		2.90
Farm Wagon Bows-		
Round Top, 1 x 2 Flat Top. 1 x 2		\$.65
Flat Top 1 v 2		.80
Fig. 100, 7 x 2	· · · · · · · · · · · · · ·	
Round Top, { x 2}"		1.40
Standard size Piano Bodies wi	th Seats-	
Each		\$4.25
	· · · · · · · · · · · · · ·	41 .20
Plow Beams—		
1 Horse		\$.70
0.17		

\$.70 .85 1.00 2 Horse. 3 Horse. All Hickory and Oak Spokes and Patent Spo Discount from Weis & Lesh List No. 5...

Vagon Neck	Yokes		
		Mixed	White
	Forest	Second Growth	Second Growth
2½ x 38".	\$2.15	\$2.95	\$4.25
21 x 38" . 21 x 42" . 21 x 46" .	2.90	4.05	5.50
21 x 46".	4.40		
3 x 44".	4.70	6.95	8.90
3 x 48".	5.50	7 .85	10.50
ingle Trees-	-Oval-	-	

ingle Trees	-Oval-		
		Mixed	White
	Forest	Second Growth	Second Growth
21	\$1.60	\$2.90	\$3.50
24"	1.70	2.95	3.60
2 7,	1.80	3.05	3.80
3 x 36"	2.45	3.55	4.20
3 x 38"			
3 x 40"	2.65	4.00	4.85

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Oval Plow Singletrees—	Forest
Oval Plow Singletrees— 2½ x 30" and under 2½ x 30" and under	\$1.00 1.25
Buggy Doubletrees—	

21" and		Mixed Second Growth	White Second Growth		
smaller	\$ 2.65	\$3.65	\$4.60		

Express Doublet	rees		
• •		Mixed	White
For	est Se	cond Growth	Second Growth
21^{7} 32	.95	\$3.65	\$5.00
2 7 3	. 55	4.15	5.50
3 " 3	. 55	4.30	5.75
Express Singletre	nes T	urnod	
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Express 5in	igietrees,		
		Mixed	White
	Forest	Second Growth	Second Growth
21"	. \$2.50	\$2.65 3.65	\$3.75
2 ["	. 2.90	3.65	4.00
$2\frac{1}{2}$. 3.50	4.00	4.75
		_	

Express Singletrees	, Square Center-	_
	Mixed	White
Fores	t Second Growth	Second Growth
21" \$3.00	\$4 .15	\$5.25
2½" 3.50	5.45	6.00

Buggy Neck	Yokes-	_	
	_	Mixed	White
	Forest	Second Growth	Second Growth
2 x 42"	\$ 2.75	\$3.15	\$4 . 5 0
21 x 21 x 42"		3.75	E AR
720	0.10	3.10	0.90

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MARCH, 1909

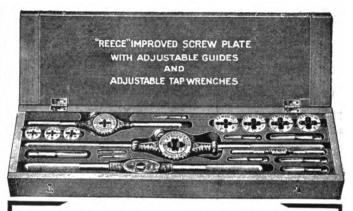
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THE MERITS OF THIS MACHINE BEFORE BUYING

Capacity ½ to 2-inch bolts and ¼ to 2 inch pipe, right and left hand Complete with Oil Pump and Tank, Gear Guards, Die Head, Dies, Tap Holding Jaws and Machine Nut Taps in eleven sizes.

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THE only hammer on which you can get a light blow at full speed. Strikes a light, elastic blow as rapidly as a heavy blow; does all the work of other hammers and more too, by reason of its more perfect adjustments and wider range of operation.

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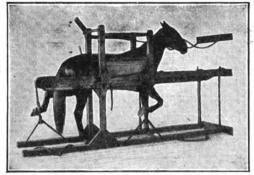
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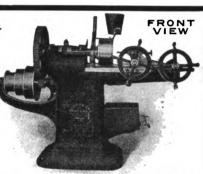
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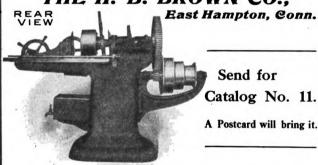
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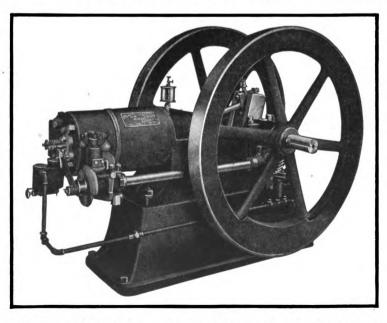


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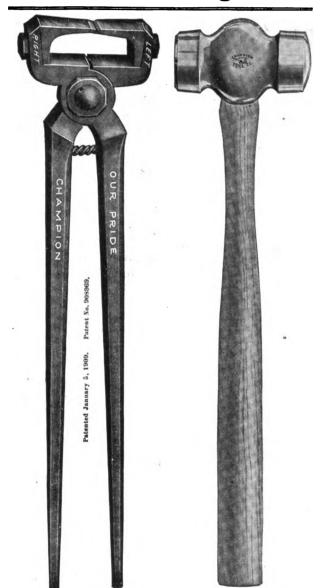
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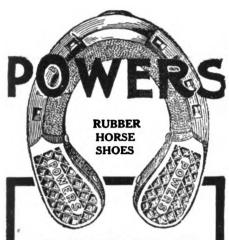


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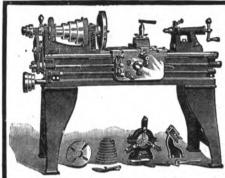
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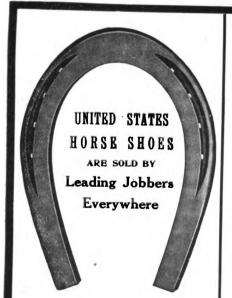


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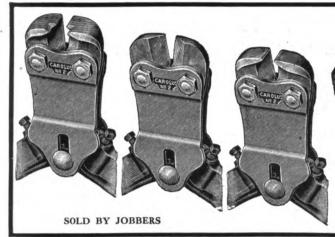
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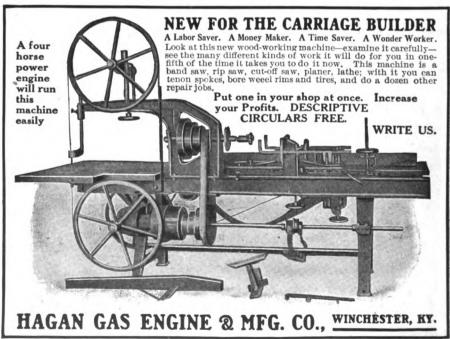


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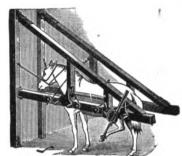
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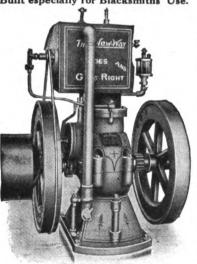
Star Manufacturing Company,

CARPENTERSVILLE. ILL.

NOTICE TO BLACKSMITHS The Went Air Cooled

GASOLINE ENGINE

Built especially for Blacksmiths' Use. 21/2, 31/2, and 6 H. P.



Look at the other en-Look at the other engines first. Note the multitude of rods, springs and triggers described as simple. Remember that the water tank (always left out of the cut) has to be filled and emptide every winter day. To forget it once may mean a ruined engine. Remember that water-cooled engines all have packed cylinder heads. Packing leaks and blows out. Inevitable trouble and loss of power

heads. Packing leaks and blows out. Inevitable trouble and loss of power sometime.

Then look at an engine that IS simple
One-piece cylinder—no chance to leak—grows stronger with use. Everything enclosed—no frail parts—no water—not a piece of packing or a gasket in it—no gasoline pump troubles. It absolutely cannot be overheated under full load—any temperature—any any temperature - any length of time. Your length of time. Y judgment tells you to

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Either of Carbon or High Speed Steel. the latter our own Special Brand

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In addition to Drills we make Reamers, Chucks, Cutters, Taps, Dies, Arbors, Counterbores, Countersinks, Gauges, Mandrels, Slitting Saws, End Mills, Taper Pins, Screw Plates, Sockets, Sleeves, Wrenches, Machines and Machinists' Tools.

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RELIABILITY COUNTS IN AN ENGINE

You can't afford to have your work stopped by a faulty engine. You will save money and time by installing a power plant that can always be depended upon to do its work.

I. H. C. GASOLINE ENGINES

are the standard of reliability. Economy of fuel and the minimum of attention are features that should appeal to you. ¶ The smith can find no engine better adapted to running air-blower, trip-hammer, lathe, grindstone, emery wheel, etc., than the I. H. C. engine.

Vertical engines made in 2, 3 and 25-horse-power.

Horizontal (portable and stationary) in 4, 6, 8, 10, 12, 15 and 20-horse-power.

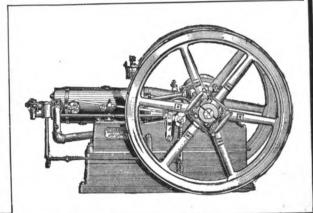
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The Most Powerful Hand Machine Made One operation of the lever does the work. No changing required

One man on the lever cuts 1-2 x 4 in.

Punches 5-8 in. hole in 1-2 in. iron.

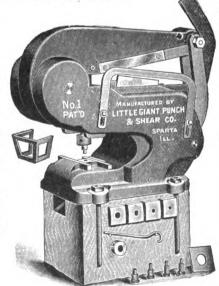
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Prompt Shipment Guaranteed



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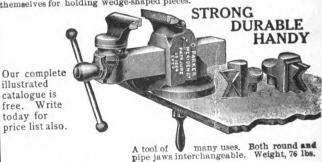
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Parker vises will be round in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

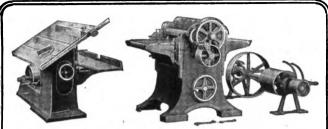
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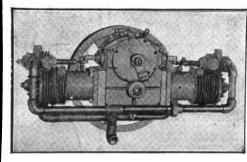
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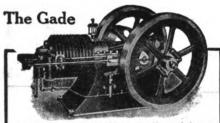


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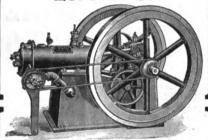
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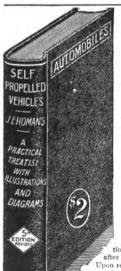
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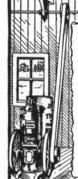
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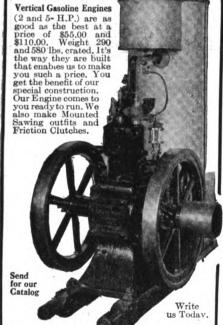
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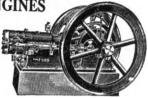


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Made in three sizes . 2½ in. Sq. Ram, Wt. 30 lbs. 3 " " 40 " 40 " 80 " " " " 80 "

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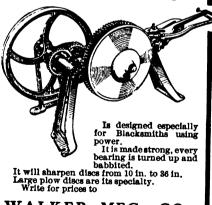
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It makes steel weld like iron. It has no equal for welding tires, axles and springs

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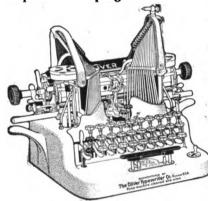
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This amazing offer—the New Model Oliver Typewriter No. 5 at 17 cents a day—is open to everybody, everywhere.

It's our new and immensely popular plan of selling Oliver Typewriters on little easy payments. The abandonment of longhand in favor of clean, legible, beautiful typewriting is the next great step in human progress.



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Business Colleges and High Schools, watchful of the trend of public sentiment, are training a vast army of young people in the use of Oliver Typewriters.

The prompt and generous response of the Oliver Typewriter Company to the world-wide demand for universal typewriting, gives tremendous impetus to the movement.

The Oliver, with the largest sale of any typewriter in existence, was the logical machine to take the initiative in bringing about the universal use of typewriters. It always leads!

Save Your Pennies and Own an Oliver

This "17 Cents-a-Day" selling plan makes the Oliver as easy to own as to rent. It places the machine within easy reach of every home—every individual. A man's "cigar money"—a woman's "pin money"—will buy it.

Clerks on small salaries can now afford to own Olivers. By utilizing spare moments for practice they may fit themselves for more important positions.

School boys and school girls can buy Olivers by saving their pennies.

You can buy an Oliver on this plan at the regular catalog price—\$100. A small first payment brings the machine. Then you save 17 cents a day and pay monthly.

And the possession of an Oliver Typewriter enables you to earn money to finish paying for the machine.

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The Oliver is the most highly perfected typewriter on the market—hence its 100 per cent efficiency.

Among its scores of conveniences are:

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 the Automatic Tabulator
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The Oliver Typewriter turns out more work—of better quality and greater variety—than any other writing machine. Simplicity, strength, ease of operation and visibility are the corner stones of its towering supremacy in

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- Addressing Envelopes
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Can you spend 17 Cents a Day to better advantage than in the purchase of this wonderful machine?

Write for Special Easy Payment Proposition or see the nearest Oliver Agent.

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The simple, cheap, convenient WHITE LILY GASOLINE ENGINE fills the bill. It is a 3 H. P., air cooled engine, carefully built and fully guaranteed. It will run lathes, drills, blowers and numerous other machines, and more than pay for itself in a few months.

It needs no engineer—and you will need no experience to run it. Uses one gallon of gasoline per day of ten hours. Compare the cost with other kinds of power.

Let us tell you more about it. Write for FREE ILLUSTRATED CATALOG and Special Offer.

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Trade Literature and Notes.

THE NEW 1909 CATALOGUE of Cray Brothers is offered free to every reader of THE AMERICAN BLACKSMITH. We hardly need to call attention to this as the announcement and a full-size illustration, of this substantial and valuable book, appears in their advertisement elsewhere in this issue, and can not fail to be seen. The book contains three hundred fifty-two pages and several thousand illustrations and lists everything of common use in the blacksmith, horseshoeing and vehicle building lines. Every one of our readers should find this book of much help as a handy reference for the shop desk. Send your name and address to Cray Brothers, Cleveland, Ohio, and a copy of this book will come to you free of charge.

OUR READERS will, no doubt, be interested THE NEW 1909 CATALOGUE of Cray Brothers

of this book will come to you free of charge.

OUR READERS will, no doubt, be interested in learning of the erection of two new three-story and basement warehouses by the Campbell Iron Company, St. Louis, as this firm has so long been supplying the trade and have won such a large patronage among our readers by reason of their excellent service. We have been advised by the Campbell Iron Company that these improvements represent an outlay of about \$75,000, and that they expect in a few months to be prepared to do business in this new place, carrying a full stock of iron, steel, heavy hardware and supplies for blacksmiths, wagonmakers and horseshoers.

a full stock of Iron, steel, heavy hardware and horseshoers.

THE DEFIANCE MACHINE WORKS, Defiance, Ohio, who are advertising a most substantial line of wood-working machinery to our readers, wish to call attention to one of their latest designs of band-scroll, rip and re-sawing machines. They state that this machine has all the latest improvements, and is most conveniently arranged for doing all kinds of band-scroll sawing, ripping and re-sawing lumber. It is a combination of three machines in one that can be changed in a few minutes from one class of work to the other. It is suited for both fine scroll sawing, and also heavier kind of work such as sawing plow beams, wagon and carriage wood stock, agricultural implements, etc. The manufacturers claim that the adjustments on this machine are so perfect that it can be run constantly without injury to the saw blade or the machine. But three horsepower are required to drive it at full capacity. For further information write the Defiance Machine Works for their descriptive circular and prices.

NOT ONLY IN THIS COUNTRY has the cold-tire setter been found most useful and necessary, but in others, for we have just been advised by the Brooks Tire Machine Company that they have received an order from Buenos Ayres ordering six of their Brooks Cold Tire Setters, this last order being a result of a trial made with a number of their machines that were shipped but a short time ago, and had evidently given excellent satisfaction and proved their time and labor-saving possibilities over all other methods of tire setting.

THE USE OF TRANSFER DECORATIONS in carriage and automobile finishing is steadily increasing.

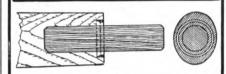
labor-saving possibilities over all other methods of tire setting.

THE USE OF TRANSFER DECORATIONS in carriage and automobile finishing is steadily increasing. Builders realize more and more the value of transfers in finishing bodies, in decorating ceilings, for limousines, etc., as they make perfect work possible, and greatly add to the general appearance of interiors. Also to get away from plain or unattractive outer views of cars plaid effects which would be so expensive in hand decoration are made possible with transfer decorations. Lower panels of all bodies, likewise, can be made to look richer and more pleasing.

There is no more serviceable or lasting process of decoration than that of transfer ornaments. Many pleasing and valuable schemes of decoration are manufactured by Palm, Fechteler & Co., 67 Fifth Ave., New York City, and the advertisements of this company appearing regularly in our columns are, no doubt, familiar to our readers. Just now this firm are announcing a new catalogue that is most profusely illustrated, and shows the latest and most attractive decorative work. For the carriage and automobile finisher and decorator this catalogue will be found

THE IDEAL SPOKE REPAIR

FOR WAGON MAKERS AND WHEEL REPAIRERS



SAVES labor, saves time, saves spokes, saves paint, saves money. Simply bore a hole in end of broken spoke, the size of tenon, drive in metal ring around the hole and drive in dowel or tenon and you have a better job than the spoke itself, because the best hickory can be used for tenons no matter what the timber is in the spoke. The above shows end and side view of a broken spoke, repaired with the Ideal Spoke Repair. The repair outfit consists of a metal ring made of tough steel tubing, beveled on the inside so as to drive in the end of the spoke without splitting it and to compress the wood around the tenon. Furnished for all size tenons from \(^3\xi_0\) inch to 1 inch or larger if desired, metal ring only, or with hickory dowels for each size tenon.

PRICE, \$1.00 FOR 50 RINGS

Complete with Dowels, Prices on Application.

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most valuable in showing an endless variety of new and pleasing designs and methods of decorating. Valuable as this book is, it can be had without charge upon receipt of an order, amounting to a dollar, or more, or, one can be had for one dollar, which amount is later credited to the first order received. This company is always pleased to supply any of our readers with suggestions and full information regarding their process and product. You will find their advertisement on another page of this issue.

New Books.

New Books.

AUDEL'S GAS ENGINE MANUAL. 512 pages. Illustrated. Theo. Audel & Co., New York City. Price, cloth, \$2.00.

This book is described as a practical treatise relating to the theory and management of gas, gasoline and oil engines, including chapters on producer-gas plants, marine motors and automobile engines. It covers the field from the historical development of engines down to their latest application and developments. It gives the latest practical infor nation regarding the management and up-keep of marine and automobile motors. It also describes the producer-gas systems and also devotes several pages to the alcohol motors; both foreign and domestic engines are described. There is an entire chapter devoted to useful rules and tables, another to hints on management and suggestions for emergencies. Altogether, this volume will prove a most valuable reference book.

FORGE PRACTICE, by John Lord Bacon (Second Edition). 279 pages. Illustrated. John Wiley & Sons, New York. On sale by American Blacksmyth Company. Cloth, \$1.50.

The second edition of this very excellent book has just been issued. It contains all the matter that appears in the first edition, be ides a course comprising thirty-three exercises, with drawings. These exercises should prove of inestimable value



The **New Little** Giant Trip Hammer

Made in 3 sizes

25 lbs. 50 lbs.

100 lbs.

The best power hammer on the market, works material up to 5 ins. round. Fully guaranteed.

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to the student, the beginner and the apprentice, and where the work is used as a text book in the forge and classroom, the exercises will greatly simplify the work of the instructor. Forge Practice is one of the most complete and practical books on general blacksmith practice that has been placed before the craft.

before the craft.

FORGING, by John L. Bacon, 128 pages. Illustrated. American School of Correspondence, Chicago, Ill. Price, cloth, \$1.00.

This book is another addition to the practical series published by The American School of Correspondence. The author, Mr. Bacon, is instructor in forge work at Lewis Institute, Chicago, and he has written a very excellent work on forging, materials and tools used and forging operations and processes. The book contains a number of very helpful tables and, besides the detailing of regular forging operations, it contains chapters on brazing, annealing, hardening, pipe bending, duplicating and the like. Also a chapter on electric welding, with illustrations of the machines used in connection with this process. As an instructive book for the apprentice, "Forging" is excellent, while the experienced smith will find it a very good book to refer to as occasion demands.

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welop the full rated horse power and more. They are guarticed for five years at any kind of work, never shut down or repairs, are absolutely simple in operation, and all sizes furnish the cheapest power for every purpose. Best for machinists, miners, millers, manufacturers, printers, farmers—for drilling, pumping, running air compression, and the sized. Write today for free Encyclopedia of Engine Facts.



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wants a fast grinder. Listen here: 50 bushels an hour ground uniform. Cob as fine as grains, reduced gradually by shearing and cutting with this

CORN BELT MILL. It's the mill for business. Grinds anything. Better principle, better made, better work and takes less power than any other. Also larger and smaller power mills and the champion sweep mill of the U. S. Write for catalog before you buy. 20 days to try it. SPARTAN MFG. CO., 970 Main St. Pontiac, Ill.

CLASSIFIED BUYER'S GUIDE.

To Find Address of any Firm given here, consult their advertisement. For its location in this issue, see Index on Page 21.

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Calking Machines. American Calking Mach, Co. Carriage Top Dressing. West Mig. Co.

Carriage Specialties. C. C. Bradley & Sons. Crandall Stone & Co. Richard Eccles Co.

Case Hardening Material. A. O. Blaich.

Clipping Machines. Chicago Flexible Shaft Co. Gillette Clipping Machine Co. Coke.

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Curry Combs. Clean Comb Co.

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Drill Chucks. Detroit Twist Drill Co.

Dry Batteries. Nungesser Electric Battery Co.

Emery Grinders. Kerrihard Company. Crescent Machine Co.

Emery Wheels. Chicago Wheel & Mfg. Co. Sterling Emery Wheel Mfg. Co.

Feed Grinders. Spartan Mig. Co.

Fifth Wheels. Dayton Fifth Wheel Co.

Files & Rasps. Heller Bros. Co. Nicholson File Co. Flexible Shafts.

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Burlington Horse Shoe Co.
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Rhode Island Perkins Horseshoe Co.
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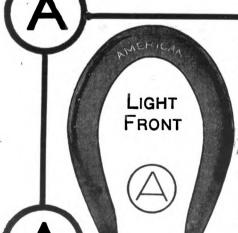
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Horse Stocks. Geo. Barcus & Co. Hemphill Horse Stocks Co.

Hub Borers. Abbott & Co. Silver Mfg. Co. Igniters.

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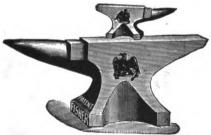
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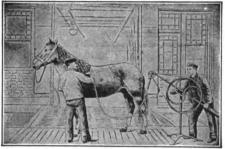
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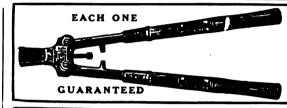
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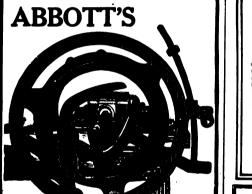




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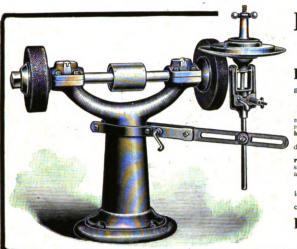
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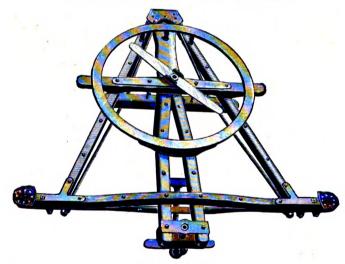
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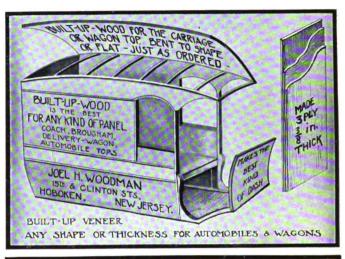
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Blacksmiths are just wild about it where it is used, and the manufacturers are either crazy or dead sure they have a "cinch" on the other fellows for they actually warrant it to be better than any other and will let you be the judge.

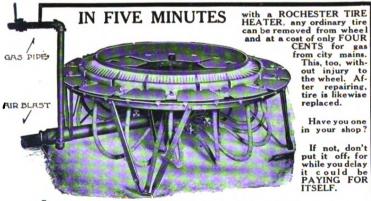
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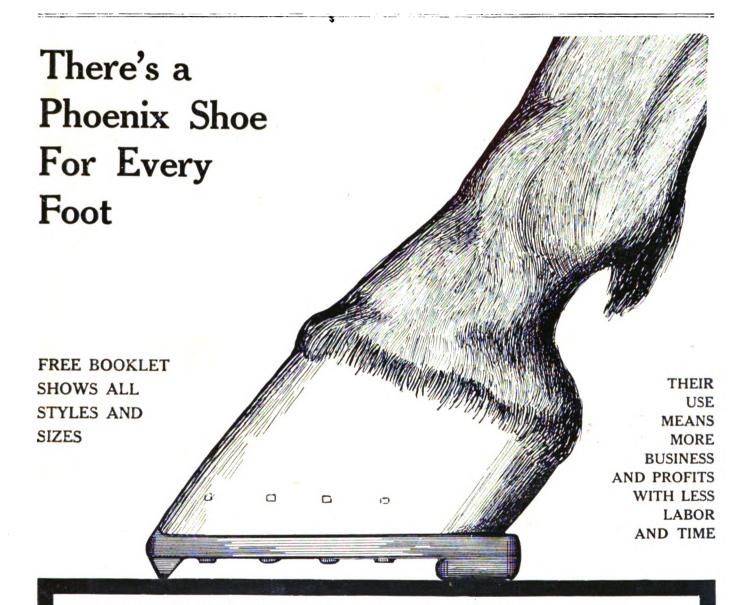
AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO N.Y. U.S.A.

APRIL, 1909

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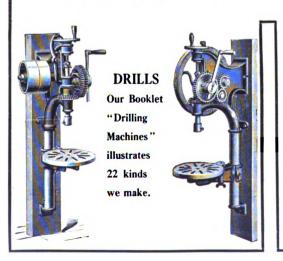
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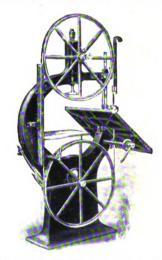






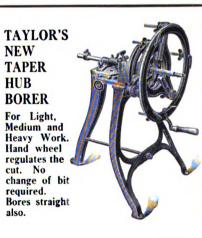
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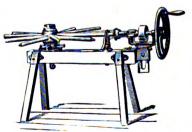
Five Sizes—8, 12, 16, 20 and 24 inch. New "patent applied for" features.



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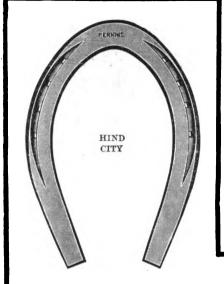
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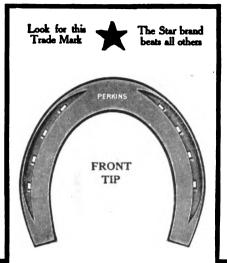




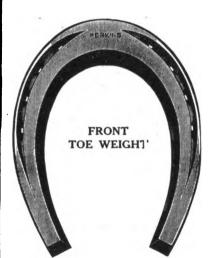
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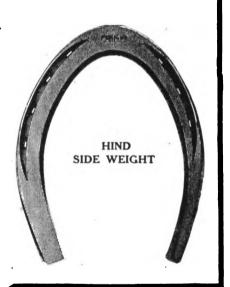






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Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths. .



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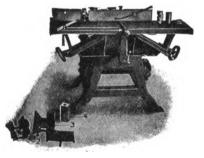
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Universal Wood Worker, fitted up with Band Saw,
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Universal Wood Worker, fitted up with Jointer, Shaper and Two Side Molder.

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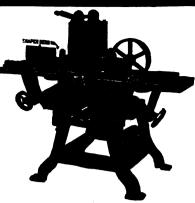
Blacksmith and Wagon Maker

We give an ironclad guarantee with every machine that they must be exactly as represented and described in catalogue and folder. If they are not as we represent, we will give the purchaser the opportunity of returning them to us and we will refund his money, paying all freight charges. Every attachment is guaranteed to work perfectly on the Universal Wood Workers. Seventy-five per cent of our Universal wood Workers which we have sold within the last eight months have gone to the blacksmith and wagon makers. A great number of them have discarded their Universal wood workers of other makes. WHY? There must be a reason for this, as a blacksmith would not discard a machine that was giving him perfect satisfaction. ANSWER: Because our FAMOUS Universal Wood Worker is the only practical woodworking machine on the market tuday for the blacksmith and wagon maker. It will save him from 10 to 20 per cent in getting out his work, over and above any other make universal wood worker on the market. It is so compact, taking up the least possible room. and can be placed in a small shop, being operated by very little power, which will enable a great many blacksmiths to place this machine, where it would not have been possible for them to put an entire outfit of woodworking machine, which consists of a jointer, shaper, band saw, saw table, boring machine, mortising machine, single end tenoner, pony planer, drum and disc sander and emery grinder, all combined in one tool. It can also be arranged for sash sticking, molding and matching.



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SIDNEY, OHIO



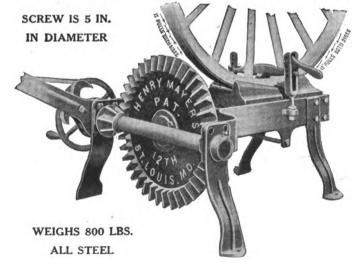


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The "Only Cold Tire Setter That Pulls Both Ways"

Will be sold this year on SUCH A BASIS that any blacksmith can buy one. Our making and selling capacity has been so increased we are going to give the trade the benefit of it by



GREATLY REDUCING THE PRICE OF THE MACHINE.

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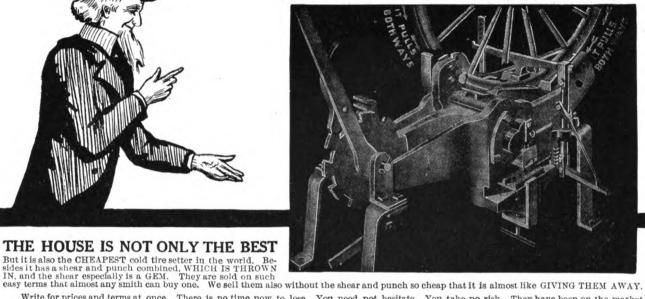
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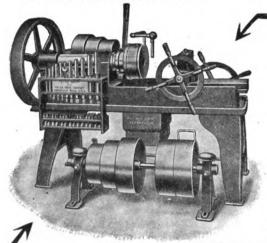
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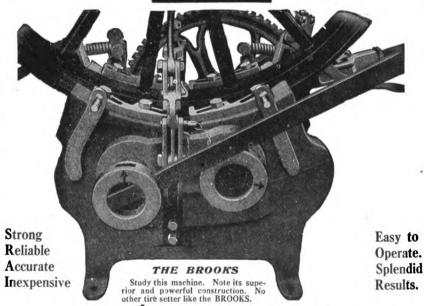
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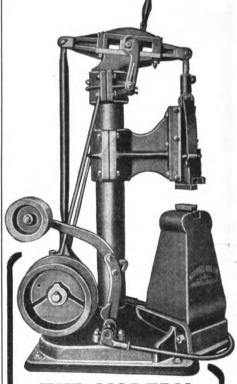
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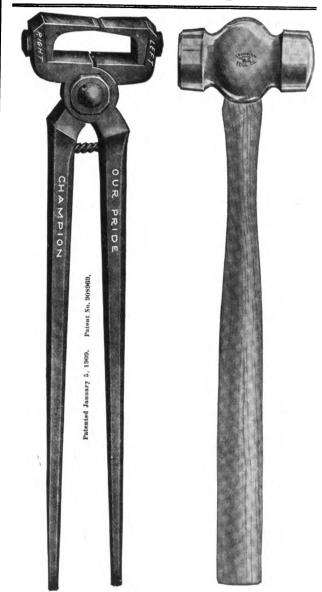
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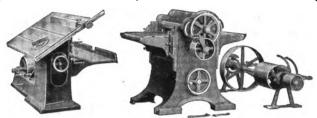
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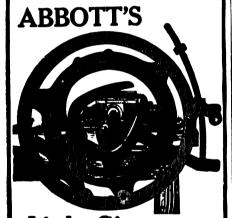




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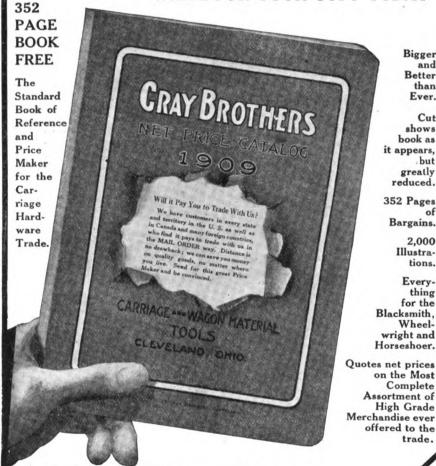
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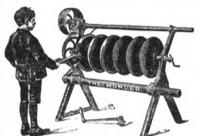
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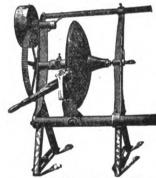
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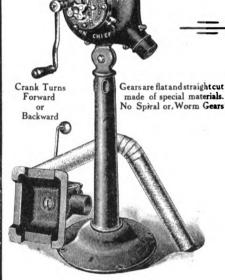




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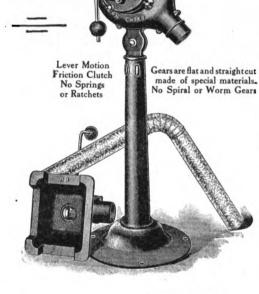
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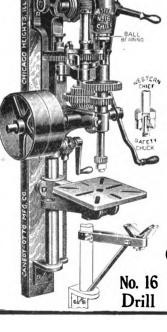
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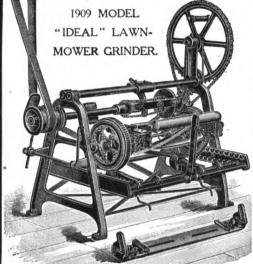
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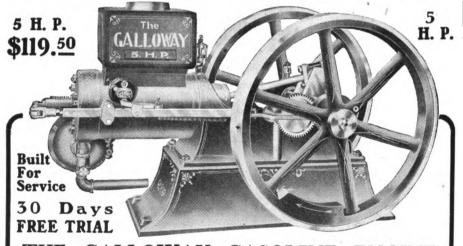
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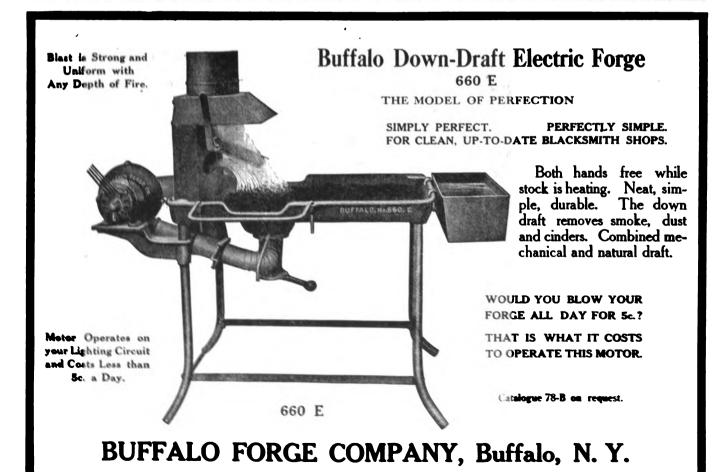
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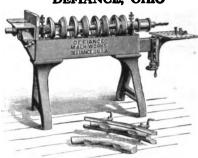
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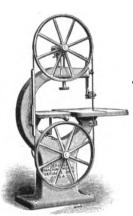
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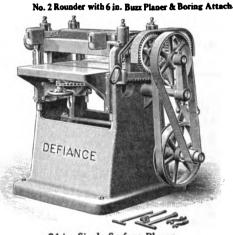
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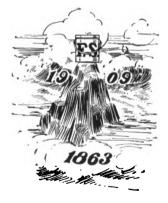






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According to Uncle Sam.

Some time ago Uncle Sam, through his boys of the postoffice department, said to all publishers of periodicals: "You must get your renewal subscriptions within a certain time or I'll get after you with a big stick." Now, of course, it is not our desire to get a swat with Uncle's big stick, either one place or another, and we hope that "Our Folks" will help us to keep out of Uncle Sam's way, by renewing their subscriptions promptly. We haven't yet found it necessary to call the general attention of our readers to this rule of Uncle Sam's, and even now we simply mention it so that our readers may be familiar with a postoffice regulation that concerns them. We want to take this opportunity to thank "Our Folks" for the promptness generally displayed in remitting for subscriptions when due, and we want to say that such support is greatly appreciated. It requires the loyal coöperation of subscriber and publisher to publish a journal such as THE AMERICAN BLACKSMITH. And we have found generally no lack of loyalty among our great family of American Blacksmith readers.

The 1909 Shop Number.

It is our intention to make this year's Shop Number more interesting and valuable than any that have been before published. The Shop Numbers have, so far, proven very popular, but we want to outdo pre-vious efforts. Pictures and layouts of good shops are wanted-you can supply them. We want photographs of good, up-to-date shops-pictures of exteriors and interiors. If you haven't a photograph, send in a ground plan or floor layout, showing the position of your machines. Also send a short letter explaining your sketch or picture, telling about the work you do, the prices you get, and anything else about your business that will interest your trade brothers. The Editors are now gathering material for the Shop Number, and they will want to hear from YOU now.

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Our Journal Still Larger.

We are going to add two more pages to the reading section of "Our Journal." We're going to give you twenty-six, instead of twenty-four, solid pages of interesting, valuable shop reading matter. And we're not going to wait until the end of the volume to do it—we're going to increase the number of pages right now in the middle of the volume. We're going to give you the two extra pages next month. Yes, you're getting a big batch of valuable matter every month now, but we're going to give you more—more automobile information, more horseshoeing, more machine smithing, more woodworking, more everything.

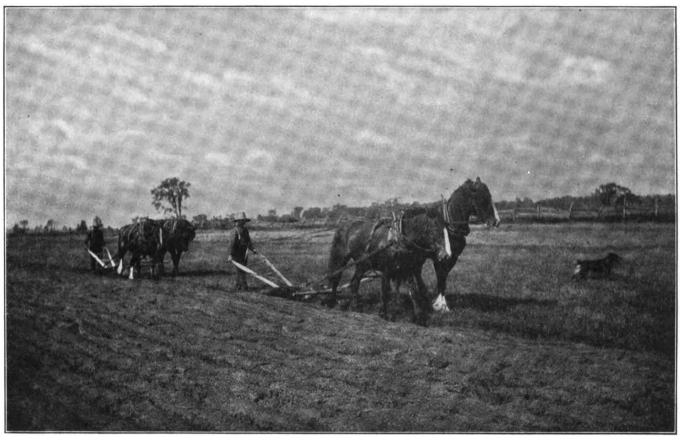
And now that we're going to get out a still bigger and better paper won't you show your appreciation by helping to get new subscribers? Tell your neighbor smiths about the bigger American Blacksmith. Give us their names, so we can send them sample copies. Tell them what the paper has done for you—what it will do for them. Give them a good, straight talk about "your" craft journal. If you send us one new subscriber and every one of our friends does the same, we'll soon have 50,000 and more. Now is the time. Show this number to your neighbor smith and then don't come away without his order.

Agents and Agents.

If you don't know the man who solicits your order and he can't show a letter authorizing him to act as our agent don't pay him any money. Give him your order, if you want to, but it is safer to send your money direct to Buffalo. Subscription agents acting for The American Blacksmith are usually supplied with a letter of authority to act as agent. Ask to be shown that letter, if you don't know him, before you hand over any money. If he can't "show you' send your money to Buffalo—and if you give us the name of the agent we will give him credit. Observance of this rule will insure you against loss.



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THE USEFULNESS OF THE HORSE DEPENDS IN A LARGE MEASURE UPON THE SHOER

Shoeing for Interfering

W. O. JULIUS

HEN a horse in motion strikes one leg with the opposite foot, the animal is said to interfere. The blow is usually struck on the inner surface of the fetlock joint, though it may be above or below this point. The injury resulting may involve the coronary band, the fetlock joint or may even extend to the knee. While the blow from the foot may cut the skin and bruise the deeper tissues it may also be so slight as to scarcely disturb the hair. The injury may cause lameness, swelling of the lower leg, fever in the injured parts and dangerous stumbling. Interfering is more frequently seen in the hind legs than in the fore legs.

In detailing the causes of interfering let us understand right here that interfering caused by improper harnessing, careless driving or weariness cannot be prevented by shoeing. In the above causes the remedy lies entirely with the groom and driver. If the animal is harnessed correctly, is evenly hitched in the shafts and allowed to walk when

tired, no injury from interfering may be feared from these temporary causes.

The principal causes of interfering are the conformation or position of the legs, improper shoeing, rough or slippery roads, improperly trimmed hoofs, or it may be caused by diseased leg or foot tissues.

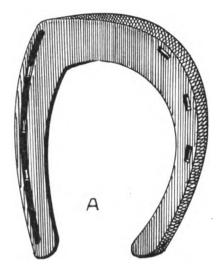
In shoeing to cure or prevent interfering let it be understood that no one shoe, or system or method of shoeing will suffice for all cases of interfering. Nor can the same method always be used successfully in practically parallel cases in two different animals. No cast-iron rules can be laid down for the guidance of the shoer of interfering horses. What will apply in one case may need to be reversed in other cases. There are, however, some points that the shoer may do well to remember in treating interfering.

Should the cause of interfering be faulty conformation or deformity it may be impossible to overcome the trouble. In such cases the best and only thing that can be done for the

animal is to apply the ankle boot. Sometimes, however, if the interfering is very slight an outside weighted shoe will give the desired results. Some shoers attempt to overcome the striking by paring and trimming the hoof in such a manner as to throw the fetlock out of the path of the opposite leg. This practice, however, is not good, inasmuch as it throws the leg out of line. And one of the first principles of correct horseshoeing is to get and keep the feet of the horse in proper relation to his body. Another practice which should be discouraged is the setting of the shoe back from the edge of the hoof. This does not assist the prevention of interfering and will in time, if continued, change very materially the conformity of the hoof.

As for the line of effort to follow in shoeing for interfering let us bear in mind the value of weighting. This can, however, be overdone, and too great a weight placed under the foot on one side or the other. There are some who recommend using just as much weight

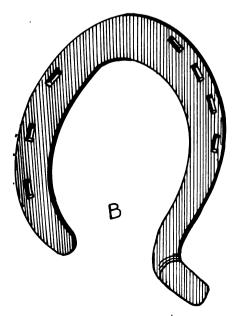
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BEVELED ON THE OUTER BRANCH

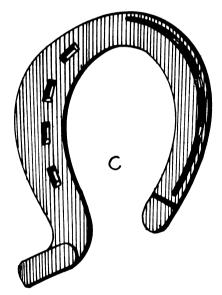
as is necessary to bring the foot away from the limb it persists in striking. This practice, however, is not commendable, for the simpler and lighter the shoes are kept the less the horse will interfere. Great lumps of iron on the feet cause the horse to handle his feet clumsily and to become fatigued, comparatively, very quickly. And fatigue is one of the causes of interfering. Whereas, if the shoes are kept as light as possible, the weight necessary to throw the foot to one side in its passage will not need to be very great, and the horse will handle his feet better and not tire nearly as quickly.

A number of shoes are shown herewith. These may be used in one form or another to prevent interfering. At A is shown a shoe beveled on the outside, but creased and rather straight on the inner branch. The inside is rather lighter than the outer branch. The shoe at B is for interfering hind.



THE OUTER BRANCH CARRIES A LONG HEEL

inner branch is regular in form while the outer branch carries a long heel with a heel calk. This shoe is made as light as possible. Another shoe with heel extension is shown at C. This shoe, however, is weighted on the outside. Another weighted shoe is shown at D. The weight in this instance, however, is carried at the point at which the foot comes in contact with the opposite leg. The shoe at E is fitted with a toe calk on the inside branch as shown and between the first and second nail holes. The small calk on the outer branch is between the third and fourth nail hole. There must also be a heel calk of the same height on the inside heel. The shoe shown at F has a long calk on the inside branch, extending as shown from the toe to the heel. The outside heel is made rather heavy with a calk. The



THIS SHOR IS WEIGHTED ON THE OUTSIDE

shoe at G is rolled on the outside from middle toe to the heel. The inside branch of this shoe should be flat and level. This is for the front foot. The shoe at H is a hind shoe made light on the inside branch and heavy on the outer branch. These shoes will not apply to all cases. Each case must be considered individually. Determine as near as possible the position of the animal's limbs and feet when in motion and apply the shoe most likely to prevent his interfering. If the first shoe does not stop it entirely determine to what extent the trouble continues and base further shoeings on your findings.

When interfering is the result of faulty conformation of the limbs ascertain just what part of the foot does the striking and then diminish the size of the hoof at that point and straighten the shoe also at that part. When interfering is very pronounced the inner

branch of the shoe may be left free of nails. To prevent the shifting of the shoe a side-clip should be formed on the outer branch of such shoes.

In some cases it might be found advantageous to lower the inside heel slightly. This, however, should not be done to any considerable degree; as it is far better to keep the foot in as near its true position and shape as possible.

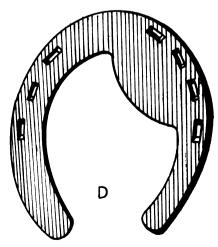
To sum up, don't try to use one style or shape of shoe for all interfering animals. Different cases require different treatment. To successfully treat interfering, the case in hand must be carefully studied and the remedy applied as suggested by the causes.

Horseshoeing and Examinations.

ANDREW M'LAIN.

I disagree with Brother E. W. Perrin in his statement that all horseshoers pass an examination before being qualified to run a business. He speaks of thousands of horseshoers who have never read up along the line of anatomy, physiology or pathology of the horse's foot. This may be true, but I don't believe a horseshoer has to study the anatomy of the foot to become a practical horseshoer. This has been proved many times. A man who has too many irons in the fire is sure to burn some of them. Nine tenths of the horse-doctor horseshoers always neglect the mechanical part of the business.

Why does a man go to college to become a veterinary surgeon if all the horseshoers are supposed to be veterinary surgeons? Now, I agree with Mr. Perrin in every respect, except this examination. Possibly he means mechanical examination. If he does, all right. I am certainly in favor of compelling a man to learn the craft of horseshoeing before he starts crippling poor

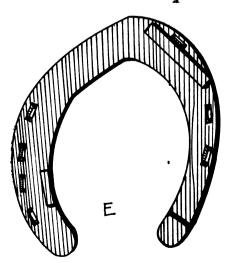


THE WEIGHT IS CARRIED AT THE POINT
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horses, as we know some of them are doing every day.

One half of the horseshoers today are butchering the horses at the customer's expense. How can you expect a man to keep the horse's foot in shape if he cannot make a horseshoe? There are too many horseshoers today making their shoes out of the keg. The poor horseshoer of the present time is robbed by the horseshoe factory, and turning shoes by hand will soon be a lost art. If I make any mistakes I want to be contradicted.

I believe every man that works at the business should be compelled by law to learn to make his own shoes. This unlettered brother of mine has "Practical Horseshoer" above his door. This is the kind of man Mr. Perrin should get after; never mind the anatomy of the foot, we will tend to that later on. Teach him to turn a horseshoe first, or at least drive one on the foot. We horseshoers who have served five long years should be protected from such men. I have worked in five different countries, but never saw so many shoers who never served one hour at the trade as there are in the United States. I never saw a farmer, coal miner or a barber shoe a horse in Ireland. The men over there would run a man into the Atlantic Ocean that tried to shoe a horse, except he is a full-fledged horseshoer. I admit there are bad mechanics in every country, but they would guit the business over there, for there is no room for them. I saw men in Ireland that called themselves horseshoers, but when they started to cripple horses they soon left the Old World and landed in our beautiful American country. I noticed lots of these kinds of mechanics making a fortune in a few years. How did they make a fortune over here? [Because

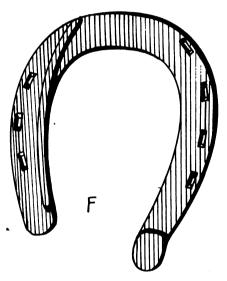


A LONG TOE CALK AT THE INSIDE TOE

they imposed upon the good citizens of the country and especially upon the poor, dumb horse.

Then, also, liquor shoes altogether too many horses of this country. It seems to be an essential part of running a horseshoeing shop. One half of the teamsters, when they want a drink, go to the horseshoeing shop, call out the boss and whisper in his ear "This horse is not walking right". The poor horseshoer digs up 50 or 25 cents and that much more goes up in smoke.

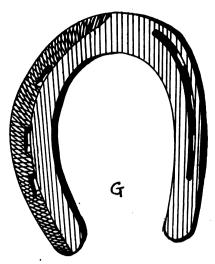
I have done journey-work in some of the largest cities in the world; have noticed these little items. I worked at one time for a man who ran a very large shop with six fires. He called me one side one day and said "You will have to be a little open with some of the customers and buy them a drink of whiskey occasionally." I quit on



THE LONG CALK RUNS FROM TOE TO HEEL

the spot. I think that is a terrible practice. It has put many a good mechanic to the bad.

Mr. Perrin, in speaking of fitting the foot to the shoe instead of fitting the shoe to the foot, is correct. There is too much of that kind of work done. If a man is not a good fitter he cannot fit a machine shoe correctly. In the first place, a machine shoe is not the proper shape for all horses' feet. Three quarters of them have the holes too near the edge of the shoe. They must fit close to the life of the foot and then Mr. Rasp comes into play and the foot looks like a soap box with the corners chopped off. I never allow my men to rasp any of the outside of foot. Any to be taken off must be cut off the surface sole and the shoe fitted flush all the way around. I allow nothing to be taken off the quarters. Some feet must be shortened on toe in exceptional



ROLLED ON THE OUTER BRANCH

cases to make foot level. But if you fit to shape of foot, nine times out of ten you will be correct.

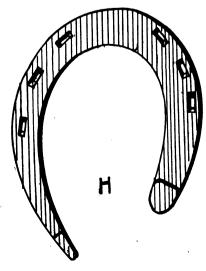
I have not criticized any of my fellow readers and this criticism will not hurt an innocent person. I should be glad to hear from other smiths on this subject.

Treating Diseased Feet.

A. T. WRIGHT.

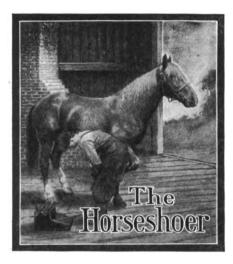
I would like to give my way of treating diseased and bad feet, such as those affected with wire cuts or have dead or dry frogs. I made a large pan out of an old circular saw. This pan is made on the order of a frying pan and will hold a half gallon. In this I mix equal parts of beeswax and beef tallow. I then put the pan in the forge and after adding about a half teacupful of turpentine let the mixture fry for about ten minutes. I now pare the horse's foot as much as it is safe to pare and then set the foot in the hot mixture for about ten minutes.

I treated a horse today that came to me on three legs a month ago. He



A HIND SHOR WEIGHTED ON OUTER BRANCH Digitized by

went out of the shop today as though nothing had ever been the matter with his feet. I took off the shoe and then set the foot in the hot mixture. I then put on a pad of felt and leather with the felt next to the foot. I then nailed on the shoe and again set the foot in the hot mixture. The hot tallow and wax draws the fever out of the foot and toughens the hoof and promotes the growth of the frog. A foot treated in this manner will mend faster than any other method I know. The feet should be treated about twice a week.



When a Ticklish Horse is brought in to be shod—go at him boldly, with a firm touch. Don't use any light touches or you may get hurt.

Youngster, Ohio.

On Your Next Case of Thrush try powdered sulphate of zinc. Or, instruct the man who takes care of the animal to clean the hoof each day thoroughly with a hoof pick and dry oakum—don't use any water on the foot.

O. E. S. New York.

Clips as a General Thing should be about as high as the thickness of the shoe on an ordinary flat shoe,—while on calked shoes they are made a trifle higher. They should also be higher behind than they are in the front.

R. M. G., Pennsylvania.

We Hitch a Nervous Horse that we are called upon to shoe in the following manner: A light, strong rope is doubled and passed under the animal's tail the same as a crupper. The two ends are then crossed over the animal's back and then brought forward, one on each side of the head through the halter rings and then to the tie ring. This animal is in the habit of pulling back when tied. When hitched in this manner he makes one or two attempts to pull back and then stands quietly until shod.

J. O. B., Massachusetts.

Horseshoes; Their Weight and Form.

G. F. STEVENS.

It is generally admitted that the lighter the shoe the better it is suited for use as a protection for the foot of the horse. But should the shoe be of

such lightness and form as to wear rapidly, necessitating its removal in a short time, it becomes a question if it is best to remove the shoe very frequently

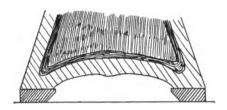


FIG. 1-AN IDEAL BEARING

or to make the shoe heavier, thus insuring its wearing at least three or four weeks. The frequent removal and repeated nailing on of the shoe must necessarily result in breaking the edge of the hoof, which is not at all to be desired. It is not always necessary to increase the weight of the shoe to improve its wearing qualities. It is more especially a question of the distribution of the metal in the shoe than increased weight. It is, therefore, up to the shoer to study, not alone the making of the shoe and its nailing, but how to distribute the iron in the shoe to give best results as to wear and still keep the shoe as light as possible. Then, also, the use of heavy shoes necessitates the use of heavy or large nails and this is not desirous.

The use of heavy shoes also tires the horse unduly and a tired horse will wear his shoes more quickly than a fresh horse. Then, some animals wear their shoes more in one part than in another. When this is the case a slight change in the distribution of the iron in the shoe will many times increase the wearing qualities of the shoe.

Of course, it is understood that some horse owners allow their animals to go altogether too long between shoeings, and in such cases it would be better for the animal if the shoer shortened the wearing qualities of the shoes. In the cities and on hard pavements horses

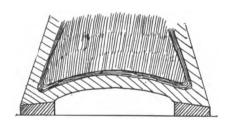


FIG. 2—SOMETIMES USED IN HOOF CONTRACTION

when in constant use can seldom wear their shoes longer than four weeks, and often shoes are not worn nearly as long as this. But in country districts and on the farm the animal can, quite frequently, go longer than five weeks before the shoes are badly worn. This, of course, leads the owner to allowing the animal to go with untrimmed feet which in time grow beyond the shoe.

The properly fitted healthy foot needs the protection of the shoe only on the bearing section. Any metal in the shoe in excess of this is superfluous. The shoe shoould be only as wide as the bearing surface of the hoof. It is, of course, understood that the hoof is healthy and that the shoer has not pared out the foot until but a narrow ridge remains for a bearing on the shoe. In the engraving, Fig. 1, is shown an ideal bearing, with the shoe just a trifle wider than the bearing surface of the wall. Another advantage in using a shoe the same width as the hoof wall is the impossibility of such a foot picking up stones, sticks, and balling with snow. However, there are cases where the width of the shoe may vary with benefit to the foot, though its thickness, except in cases of disease or injury, should remain the same from heel to heel.

Other foot bearing surfaces are shown in the other engravings. Fig. 2 illustrates a shoe that will prove practical in some cases of hoof contraction, though

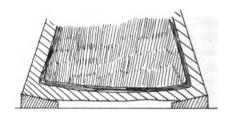


FIG. 3—THE EXTREME SLOPE NOT RECOMMENDED

the slope to the hoof surface of the shoe should not be too great. The shoe shown in Fig. 3 is sometimes recommended for a convex or drop soled foot, so as to prevent the shoe from bearing on the sole. This extreme slope, however, is not good, and some flat bearing surface should be had.

An easy method of improving the gripping qualities of a shoe without increasing the weight is to bring the fuller or crease down well toward the heels and toward the toe. The crease should not be brought around the toe, however, especially if a clip is used at that point, as the wear is greatest here and the metal must be allowed to remain there as protection. See shoe in Fig. 4.

The Arabian Horse.

The history of the Arabian horse dates as far back, some writers aver,

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MR. M. S. MEWITT, A TEXAS SHOER, AND HIS SHOEING EXHIBIT AT THE SAN ANTONIO FAIR WHERE HE WAS AWARDED THREE FIRST PRIZES

as the ark. However this may be, distinct records are pointed to as far back as 2,000 years B. C. The breed is distinct and different from other horses both in temperament and formation of bone structure. It can be put to practically any service and its display of endurance, intelligence and kindness are sometimes surprising.

In height the Arabian, on his native soil, averages 14 hands 2 inches. But those animals of the Gomeessa tribe, who pay better attention to their horses, will stand 15 hands at two years. Some say the Arab horse is small, but when the method of rearing the animal is seen one cannot help but conclude that the Arab is a big horse.

"The horse is hobbled fore foot to hind foot" says Mr. Homer Davenport speaking of the hardships that the Arabian horse goes through from the day he is born. "And thence from forefeet and hindfeet to pins driven in the ground. In that way the animal spends his entire life when not under the saddle. And even under the saddle the animal's life is not easy. Their feed consists of a nose bag full of dusty, dirty chaff and ground up straw that has been threshed by the hoofs of cattle and donkeys. This dusty, dirty chaff, tainted with the buffalo's feet is all that the animal ever gets in the way of hay, and that with a nosebag of barley constitutes the daily ration. I am speaking now of the horses reared by the best tribes. They are never watered over once a day, and that water a strong alkali lime mixture, which is, possibly, accountable for the great bone of the Arab horse, so finely exhibited in the skeleton of "Marengo," Napoleon's war horse.

"The Arabian horse is never taken under shelter from the sun's awful rays,

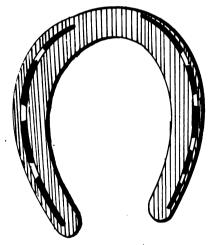


FIG. 4-A WELL-SHAPED SHOE

neither is he protected from the vicious storms of winter. The Bedouins ride them at two years old and sometimes take them into war at three."

In the shoeing of their horses it would appear that the "sons of the desert" had reached the height of animal cruelty. Mr. Davenport describes the Arabian horseshoer as a butcher. He says: "They call themselves blacksmiths, but they are in reality criminals who ought to be shot. The frog of the horse's foot is practically cut out. Then, with an axe, the animal's foot is made to fit the shoe, which is a solid piece of oval steel having a small hole in the center. These shoes are nailed on with large heavy looking nails that, it would seem, were more suitable for use on barn doors than on the noble Arabian horse.'

A horse fed on the food mentioned, watered little and going, at times, for 24 or 48 hours without either food or water, then withstanding the butcher who puts on his shoes, galloping hour after hour and day after day or standing in the baking, bleaching sun, and in the face of all this attaining a height of 15 hands at two years is, instead of being a small horse, really the largest horse known.

In disposition the Arabian animal is gentle and very affectionate. They are practically fearless even of man. In color, contrary to common belief, the Arabian is generally anything other than pure white. Mr. Davenport says: "During our travels among the desert tribes I saw only one pure white mare. Perhaps out of a hundred mares among the Anazeh you would find 35 bay, 30 gray, 15 chestnut and the rest brown. I saw only one that you could call a black horse and this animal was of very small size."

The accompanying engraving shows Mr. Davenport among the great Anezeh



AMONG THE GREAT ANEZEH TRIBE ON THE ARABIAN DESERT Digitized by

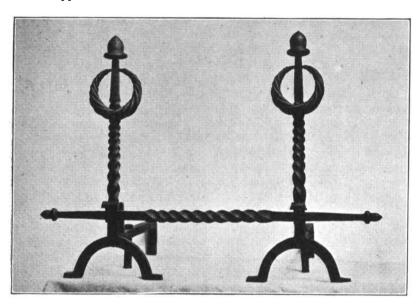
tribe on the Arabian desert. This tribe is said to be the most uncivilized in the world, though surrounded by the best horses. The tent in the middle foreground was the one occupied by Mr. Davenport and his party. The tents of the Arabs are shown to the left in the picture.

A Talk on Horse Clipping.

L. J. STOCKLEY.

Don't suppose, after you get a clipping machine, that every horse you see should be clipped. Some horses are

a skin that is very sensitive or prone to disease, will be better for allowing their hair to grow long. But the horse in good health will be greatly benefited by having its hair cut. With a long coat of hair the horse perspires freely and soon becomes covered with sweat. The horse is allowed to stand, and in a fatigued condition it may take some little time before the skin becomes entirely dry. The pores of the skin open freely during perspiration, and when standing the animal becomes chilled, the skin instead of a healthy glow stays



A SET OF ARTISTIC ANDIRONS

benefited by clipping, others are not. But before going into details on this subject let us first consider the machine for clipping. There are a number of machines on the market—some good, some bad. It is economy to buy a good machine. A poor machine is expensive at any price. Don't waste good money on a poor machine. And if you can use electricity, or have it in your shop, get an electric clipper, by all means. It is the ideal machine, though the hand operated clipper is good and easily operated.

Clipping is without a particle of doubt the job of the horseshoer. In some cases the livery man takes the work away from the shoer, but it is business that belongs to the shoer. And as there is good money to be made at it there is no reason why the shoer shouldn't do the work. The investment is small compared with the money received from the work of a good machine.

It is folly to suppose that all horses should be clipped. As stated before, some horses will be benefited; in fact the majority of horses will be. But, horses that have a very tender skin, or

cold; and obstinate skin diseases may result. Then, also, the internal organs may be seriously affected.

When healthy horses are clipped, all this danger is overcome. The animal's spirits are greatly heightened and he becomes more active and jaunty, throwing off any tendency toward sluggish movements. In short, the whole constitution is improved, the appetite is better and the animal accomplishes more work with less fatigue than when unclipped. It, is, therefore, economy to rid the animal of his long, heavy coat.

From the viewpoint of the owner, or caretaker of the animal, a clipped horse is more easily cleaned and kept clean than one on which the long coat has been allowed to remain. Then, also, a horse presents a much better appearance when clipped than when he carries a long, shaggy coat.

The progressive shoer will do well to keep these points in mind so as to be able to speak intelligently on the subject of clipping, to his customers. Horse clipping is by no means a side line for the shoer, but is part of his regular busi-

ness. He can make a profit at it and a good profit, too. But he must have a good machine and do his work right.

Lame Horses and What the Shoer Can Do For Them.—4.

E. H. MALOON.

We have looked at the joints and the foot as it stands on the ground. Let us now pick it up and look at the bottom on the ground surface.

First, we have the outer or horny sole: under this is the inner or sensitive sole: then we have the horny frog and under it the sensitive frog. Immediately under this is the navicular joint. This joint is the seat of much The shoer can do but lameness. little for it, so we will not discuss it at length at this time, but will say that one of the most important things to do is to pare the foot level. was asked the other day what I meant by a level foot. The best definition I can give is, have the bottom of the foot so a true shoe will touch all parts of the wall. Another definition is to have the wall touch the floor as hard in one part as the other. But a sound horse will generally wear his foot level and then my rule, given in the first article on paring, is applied. It is always safe to keep the foot natural and let the horse bring his foot to the ground as he wants to. You will never make headway trying to make a horse's foot do differently than nature says it shall.

If the shoe is worn most on the outside, I know that the inside of the foot is not doing its share of the work and I either lower the outside or let the inside alone until it grows long enough to bear its share of the burden. I pare a horse's foot flat, i. e., I take as much off the sole as I do the wall and no more. A good thick sole is what we want. The dead hoof gathers moisture through the day and the foot will not dry up as quickly as it will with a thin sole. The above applies to unpacked feet. If the foot is to be packed in tar and cotton I take out everything down to the live hoof. After the hoof is pared it should stand in conformity with the leg. And here is where experience and a true eye comes in, as each horse should be left as nature made him. One thing more, whatever trimming you do, take it off the bottom of the foot, and cover with a shoe the entire wall of the hoof you leave.

(To be continued.)

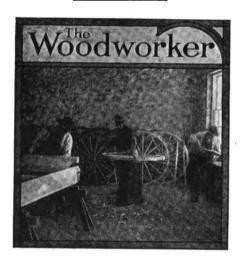
A Set of Artistic Andirons.

The andirons shown in the accompanying engraving are the work of Mr.

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M. F. Lenfest, a Michigan reader of "Our Journal." Mr. Lenfest's work is exceptionally artistic and the design is simple and strong. It will be noticed that the standards have a graduated twist which is very neat. The cross bar is well made and very nicely proportioned. The rings made of small stock, welded at the ends and then twisted, are very neat and artistic. Altogether, Mr. Lenfest's "Fire-dogs" show excellent composition, good workmanship and fine artistic effect.

Photographs of ornamental iron work are always welcomed by the editors, and readers are invited to send in pictures of their efforts in this line. An explanation or description of how the work is done should accompany the pictures.



Making the Wheels Track When Not the Same Dish.

A CONNECTICUT READER.

An article in the February number of your valuable paper entitled "A Question for Vehicle Men" attracted my attention: Suppose you get an axle to set or rather reset where one wheel has got about three inches dish and the other three fourths of an inch dish, how are you going to get your four wheels to track properly?"

In my opinion it does not matter whether the dish of the wheels compares or not. The wheels can be made to track properly. I have had several jobs of this character and have always been successful; therefore I have reason to think I have at least one theory that will accomplish the end sought.

To set an axle of this kind does not involve any more complex problem than setting an axle for wheels with the same dish. My method is to set the axle to the wheel, that is, so as to have the spoke set a little under, about one fifth of an inch. To accomplish this it is necessary to use a square. We

have one especially for this purpose, but an ordinary square with a straight edge and an axle gauge is as good.

Setting the axle as near as possible with the gauge I next try it in the wheel and try the square on the spoke. If it is not right I set it under more, or take some out, whichever is necessary, bearing in mind that the spoke should set under about an eighth of an inch. That is, there should be an eighth of an inch between the spoke and the square down near the felloe. If the wheels are all brought to this they will track regardless of any difference in dish; of course, allowing that the axles are the same length.

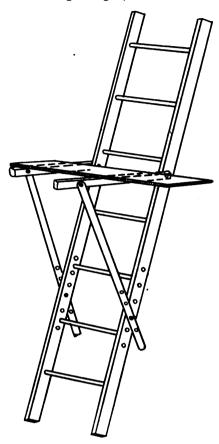
This is obvious when it is considered that the spokes when down are the same distance from the collar of the axle and it follows that the wheels must track. As my friend who asks this question is from South Africa I think it will be well to mention the method used by a South African who worked with us. And if my fellow craftsman used the same then he is justified in saying it cannot be done. His method was as follows: To set the axle so that the bottoms of the wheels were three inches narrower than at the top. It will be readily seen that it is, I might say, impossible to set an axle anywhere near right by this method.

A Clamp for Putting On Heavy Rims.

E. E. WARNER

Take a piece of 1½ by ½-inch stock and cut it 30 inches long. Drill a ¾-inch hole about ½ inch from each end and then bend piece in a circle. When bent to shape it will make a circle 9 inches in diameter as at A, large enough to drop over any ordinary hub. Next cut a piece of 1½-inch round stock 30 inches long and turn an eye on both ends. Then bend to shape as at B. Take a piece of 1½ by ¾ by 12 inches long and drill two ¾-inch holes 2½ inches apart in one

end and drill a ½-inch hole in the other end and tap it for a §-inch rod. Now bend at right angles, two inches from

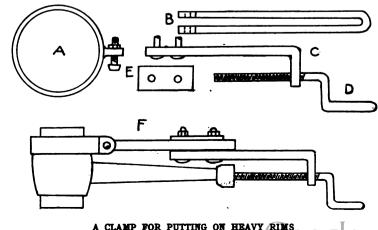


A HANDY LADDER BRACKET

the end as shown at C. Then take a piece of §-inch round, 15 inches long, thread four inches of it and bend as shown at D. Next take a piece 2 by 3½ by ½-inch stock and drill two holes 2½ inches apart as at E. This is to connect the parts and make an adjustable clamp as shown at F. I have put on 2 by 4 by 30-inch bone-dry rims with this clamp.

A Handy Ladder Bracket. D. FOSTER HALL.

The accompanying sketch shows a ladder attachment which is very handy



A CLAMP FOR PUTTING ON HEAVY RIMS

and easily made. It consists of four pieces of iron 1½ by % inches and sixteen inches long. They are riveted together at the angle with ½-inch rivets. The other ends are fastened to the ladder with ½-inch bolts. There are holes drilled in the upright pieces for adjustment. A long stage can be made with this appliance by using two ladders placed side by side and a board reaching from one to the other.

An Illinois Vehicle Shop. w. f. segelhorst.

The accompanying engraving shows a picture of my shop which is thirtyfour by sixty-two feet and twenty feet high. The lower story is divided into three parts; first for wood work, twenty-two feet deep, eighteen feet for blacksmith shop and the balance for implements and repairs. The top story I use for wood stock, also for iron and some implements. The wood stock I have on the floor is most of it ready for use. I have my wood in another building till it gets dry, and do not use it until it is at least four years old, except axles which I put in my shop when I get them from the sawmill for three cents per foot. They are fit to use in two years. The wood which I now use for felloes is ten years old. I have about two hundred and seventy-five wagon tongues on hand, about one hundred and fifty axles, about five hundred bolsters and about twenty thousand feet of twoinch stock. I made eight new wagons last year. I think times are getting better for hand-made farm wagons, as we get a better price for them. Lastly. I want to say if a man wants to stay in the wagon business he wants to have plenty of dry wood on hand, treat your customers right and you will have plenty of work.

Some Practical Notes.

C. R. COVINGTON.

After you remove the nuts from tire bolts take a hammer and strike a lick on the head of every bolt. This breaks the rust and bolts will drive out without bending and bradding.

To remove broken shovel handles turn shovel bottom upwards, clamp shank in vise, cut off heads of rivets with a sharp chisel and punch out rivets. Now clamp vise on the wood and drive shovel off with a block of wood.

If you ever catch up with your job work make stove flue irons, plow hame hooks, andirons, lap rings, iron up some singletrees or make a few plow beams. Make some old time wood-rakes or scouring-brooms out of your scraps of wood which you have left from other jobs. Put up a few watering troughs for horses, cattle and hogs—doubleperhaps you do. Anyway, it wont do you any harm and may do you a world of good.

Be enthusiastic about your business.



BROTHER SEGELHORST'S ILLINOIS VEHICLE SHOP

head and bolt and clamp them. If your shop is in the country keep plenty of shovels, hoes, pitchforks and axe handles on hand. There are always plenty of these tools scattered about over the country needing handles and they are as good as new ones when properly handled. By all means order these from the factory.

When you want to make a weld do not forget to drive up ends so you will have plenty of stock to draw on. Keep your shop and patrons out of your debt. Charge enough for your work and material to keep you in material and furnish you a living. People will think more of you than they will if you work for nothing and then have nothing to do their work with. When you cannot get your pay, sit down and rest and be ready to do work for the man who will pay for what he gets.

Thornton's Letters.—24.

Being "Straight-from-the-shoulder" Talk from a Prosperous Self-made Smith to his Former Apprentice, now in Business.

Dear Jim:

When you plant the idea in a man's head that you are successful, the rest is easy. And bluff plays a good big part in planting the idea. Success brings success. It's just about as hard to mix oil and water as it is to mix success and failure. People don't like to trade with a man who doesn't appear prosperous. By talking hard times every time a customer comes in you can discourage more trade than most anything else can.

I am going to make this a letter on Seeking Success in Smithing. Perhaps you don't need it and, then again, A business man without business enthusiasm is about as useful as a gasoline auto without gasoline. And then, too, enthusiasm is contagious—it's catching, and customers like to catch it.

Talking of customers right here, reminds me of a little motto that I pasted on the cover of my first ledger years ago. It read "study your customers." That's all-just three words-but, my, what they mean! Study your custom-Study their financial condition, their temperament, their whims and fancies. Study them up and down, all the way around and then try it backwards. You'll find some of them need coaxing, some driving, some want it with sugar, others with vinegar and still others want a mixture of the twosweet-sour, as we used to say when we were kids. And it's up to you to keep a jar of each brand of treatment always on hand. But woe be unto you if you get your jars mixed.

And, another thing, don't ever get the idea that you can please everyoneyou simply can't do it. But, then again, don't slush over this fact by not trying to please as many as you can. If a customer kicks, don't kick Try to please him if you can. back. Reason with him. If you are in the wrong admit it, and show him how ready you are to fix matters right. And then fix 'em right. This telling customers to go to some other shop when they kick on something is not business and has no place in the business practices of the modern business man.

Let me say finally; while we are in business for money and while the trend of the times is toward an accumulation

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of wealth you can't secure happiness by trying to squeeze joy out of money alone.

In closing, I want to say that this is just a short letter, but there's food for thought in it.

Yours for success.

Thornton

Brazing Cast Iron.

F. T. BROWN.

To my mind the brazing of cast iron is yet in its infancy and that the future will show it to be one of moment. Brazing is particularly adapted to automobile repairing, and each year we are using more cast iron for our machinery. Again, improvements are the order of the day and as each machine goes out of date and the patterns are destroyed it often becomes difficult to obtain duplicates, and this means great cost in new patterns and castings. In view of these facts together with the cheapness, neatness and quickness with which castings can be repaired by brazing them I think that it is obvious that brazing cast iron will be a great industry in the near future.

I have taken a great deal of interest in this work since we organized the Fairfield Brazing Co. five years ago. I have been "at home" ever since to all those who have had broken castings. We have made many failures, of course, for we knew practically nothing about the business when we began and, as the sources of information at that time were few and far between, we literally pulled off our coats and went at it with determination to make a success of it, if such a thing were possible. We are doing a very good business today, with a steady gain. We have very few failures now and are hoping to reduce even these few in the near future.

The brazing of cast iron is peculiar work. I have brazed cast iron without any preparation whatever, other than borax and brass, but the piece was exceptionally good and great care was taken with the heat. To make a success of brazing cast iron it is imperative that a good preparation be used to lead the brass down into the crack. There are many preparations used for this purpose-some are very good, while others are not so good. I have not tried them all, but I have tried many of them. I think I have eight or ten samples of different preparations that have been sent in for me to try out. Some of these I have found very good, indeed.

Another requirement is a good flux;

pure borax is too light and will not work satisfactorily. But the most important of all is the heat; it must be clean, penetrating, soaking, and the casting must be heated slowly evenly, and brought closely to the melting point before the flux is applied. After the flux has been well worked in and one is satisfied that the fracture is completely filled with it the brass is applied and, if a good preparation has been used, it is really a pleasure to see how quickly the brass will run, filling every part of the crack so that it is almost impossible to tell where it is. The study of the expansion and contraction of cast iron will keep the grey matter of a man's head busy for some time, and there are likely to be many moons before one can tell just where to heat or cool a complicated casting to bring it into the position he wishes.

I do not wish my readers to think for a moment that I have an idea I cannot learn anything more about brazing. The fact is, I am quite sure that I have just begun to get an insight into it and I am writing this not only to tell what little I know on the subject that may help those who are beginning in this line, but with the idea of getting points from others as well.



"The problem in every line of industry is a problem of the utilization of waste." Said the Editor in reply to Benton's question as to the biggest problem before the trade world.

"In every industry there is a big problem' continued the Editor. "The big problem before all is the conservation of waste. President Roosevelt had much to say about the conservation of our national resources, but it is not a recent problem. It's been a problem for centuries. What to do with waste has been asked for years by manufacturers and others.

"The other day, I was out to the steel plant. Out there they harness the hot gases from the blast furnaces to run the big engines that operate the blowers. In the big Chicago and Kansas City packing houses they now use and have for several years used every part of the pig from nose to tail tip. They used to say that everything but the squeal was utilized, but I think the phonograph companies now buy the squeal. Up to a few years ago the big culm heaps, at the mouth of coal mines, were burned to get them out of the way. Now, practically every part of what was formerly useless dust is used and made to fatten the profits of the companies operating the mines. In the days of the small oil operator the only thing thought of was oil for lighting. What was left of the crude petroleum after the kerosene was taken out was thrown away. The Standard Oil Company, it is said, now makes more money from the by-products of their oil than from the oil itself. A friend of mine, employed as a chemist by a large manufacturing drug house, was one noon strolling through the yard back of the big laboratories. A large pile of refuse caught his eye and after looking at the peculiar stuff for a few minutes he took a sample to analyze. He discovered that his firm was throwing out valuable matter. He showed them how to make use of it and today he is one of the firm.

"Examples innumerable of how waste is being saved can be pointed out. But for all that there is still lots and lots of material wasted. Take lumber for instance—it is wasted as though the supply was inexhaustible. Better methods are needed in lumbering. The battle against waste is natural and waste must fade from the earth. While power generated by water was used centuries ago it was not until comparatively recent years that the immense power wasted in waterfalls has been harnessed."

"I never thought of waste in just that way," said Benton. "There are undoubtedly any number of lines in which the saver of waste can poke his nose."

Townsend came in at this point and after greeting the Editor asked Benton for a receipt for coating some small pieces of steel with brass.

"You'll find electro-plating to be the best" said Benton. "Any plating works will do it for you."

"I don't want them plated that way," returned Townsend. "Some simple way of getting a thin coat of brass on the pieces will do nicely."

"I'll see what I've got," said the man of receipts, as he turned the leaves of his note book. "Here's a simple process. Clean iron or steel pieces thoroughly and then using boracic acid as a flux dip pieces into melted brass or spelter. Wipe the pieces while hot and a good coating of brass will be the result."

"That's just the thing," said Townsend.
"It will suit my purpose fine. You see I've been repairing that machine of old man Simpkin's again and in fixing it up I knocked some of the brass off some parts of it. Naturally I've got to get it into good shape, as he wants to demonstrate his machine to some new man he wants to finance his company." And with a hearty "thank you" he went out.

The Arab's Farewell to His Steed.

CAROLINE E. F. NORTON.

My beautiful! My beautiful! that standest meekly by,

With thy proudly-arched and glossy neck and dark and fiery eye.

Fret not to roam the desert now with all thy winged speed;

I may not mount on thee again—thou'rt sold, My Arab Steed.

Fret not with thy impatient hoof, snuff not the breezy wind,—

The further that thou fliest now, so far am I behind.

The stranger has thy bridle rein,—thy master hath his gold.

Fleet limbed and beautiful, farewell!— Thou'rt sold, my steed, thou'rt sold.

Farewell! Those free, untired limbs full many a night must roam

To reach the chill and wintry sky which clouds the stranger's home.

Some other hand, less fond, must now thy corn and bed prepare;

Thy silky mane I braided once must be another's care.



The morning sun shall dawn again, but never more with thee

Shall I gallop through the desert paths, where we were wont to be.

Evening shall darken on the earth, and o'er the sandy plain

Some other steed with slower step shall bear me home again.

Yes, thou must go! the wild, free breeze, the brilliant sun and sky,

Thy master's home—from all of these, my exiled one must fly.

Thy proud, dark eye will grow less proud, thy step become less fleet,

And vainly shalt thou arch thy neck, thy master's hand to meet.

Only in sleep shall I behold that dark eye glancing bright;

Only in sleep shall hear again that step so firm and light.

And when I raise my dreaming arm to check or cheer thy speed,

Then must I, starting, wake to feel—thou'rt sold, My Arab Steed!

(Concluded next month.)



Anybody can keep a smith shop, but it takes a smith with business and trade sense to have a shop keep him.

According to some smiths the craft has been "going to the dogs' for some time. But the dogs are still waiting.

Branch Out—try some side line this spring. There is certainly something that you can sell your customers at a fair profit.

Best time to start a county organization is right now. Ask for the secretary's easy plans—a penny postal will bring them.

Mix a bit of nature with your life of hoofs and iron. A garden plot will help. If you are too busy, get the little ones interested.

A good time right now to give the shop a coat of paint.—No flies or dust now. A good appearing shop is a business getter.

Get the normal tone of your engine firmly fixed in your ear and then when going wrong its unusual tone will be quickly apparent.

Far above the forging of tough, black metal is the forging of character in the man. For after all is said and done this is really the purpose of life.

Strict tab on your business will tell you whether you've gone ahead or behind. Of course you know how March of this year compares with a year ago.

Some smiths put prices on their work and then hold to them like a vise. When costs go up your selling prices must raise with them if you wish to succeed.

When your funny spot gets a jolt, laugh right out loud. A smiling face and a heart of sunshine seldom call the doctor. And then, too, a cheerful spirit is a trade winner.

Don't forget the Shop Number.—there'll be lots of room for good shop pictures. If your shop hasn't yet been represented send in a photograph and description right now.

You'll find some of these new roofings better covering for the shop than a mortgage. And if the roof is kept in repair chances are you'll never need to load on a mortgage.

A pigeon farm said to be the largest in the world is located at Los Angeles, California. There are more than one hundred thousand birds on the farm and they eat two tons of wheat a day.

More autos than ever before will be sold to farmers this season. All manufacturers have prepared for big business. Are you prepared to care for these machines when they break down?

Cut the price and you cut your profit every time. You can't take anything off the cost end of the selling price after the job is done. But, perhaps your end of the selling price is too big?

The price of horses continues to hold steady, notwithstanding the continued and increasing popularity of the automobile. One would naturally suppose just the reverse, but "The horse aint't wint yet."

A number of good openings are reported in Western Texas. Material is not as high as farther south in the state. If you are interested, write to Clark and Smith of Munday, Texas, enclosing stamp for reply.

Some idea of the great amount of metal in a battleship may be had when you learn that the new "Florida" now building will contain 8,907 tons of material in the hull alone. Of this 480 tons will be rivets from \$\frac{1}{4}\$ to \$1\frac{1}{4}\$ inches in size.

Every added subscriber helps us to improve the paper still more. The more subscribers the better the paper. Help improve "Our Journal" by sending in a new reader. We'll give you six months' credit for every new subscriber you send us.

John Hogan says "I spint seven years as apprentice without so much wage as would buy a sock for me foot. When I shoe a horse I put my experience into the work, and I must get paid for my knowledge as well as my work."

Once upon a time there was a blacksmith who succeeded in business and waxed exceeding fat—and he didn't read a craft paper. But that was before the time of craft papers, before competition and when the next blacksmith was located in the next county.

One man we know can't make blacksmithing pay, though he's been at it for years. He says it's his wife's fault. "She don't give me the right kind of encouragement' is how Tom quiets his conscience. And Mrs. Tardy, poor soul, works harder than Tom ever thought of working.

Two Heroult furnaces of fifteen tons' capacity each will be installed by the steel trust. These furnaces are operated by electricity and are said to produce a metal equal to tool steel in quality. The Heroult electric furnaces and methods are already in use in several European countries.

The school of mines and metallurgy of the University of Missouri announces a sixweek summer school, beginning June 14, 1909. Course will be given as follows: Fire assaying, chemical analysis, mineralogy, metallurgy laboratory and mining. For full particulars, address Mr. L. E. Young, director, Rollo, Missouri.

You cannot keep outstanding accounts to the lowest notch unless you know who owes what. Keep your finger on the pulse of your business and it will never need the service of the doctor. Inattention to collections has killed many a business. Large and frequent doses of "Collector's Cordial" will go a long way toward keeping a business strong and healthy.

Increased by two will be the number of our reading pages in the very near future.

This means 312 a year instead of 288. And the subscription price remains the same—\$1.00 a year. This improvement in "Our Journal" means still more solid, practical craft information for the same old price. It means 26 pages chuck full of interesting, money-earning trade news, not the social news, not political news, but such news as will help you and every other reader to increase your craft efficiency. Tell your Neighbor.

American Association of Blacksmiths and Horseshoers.

You've heard and read about the "White Man's Burden," but have you ever thought seriously about "The Blacksmith's Burden?" That's a white man's burden, too. Price-cutting is one of the blacksmith's burdens. Low prices is another—dissatisfaction is another—and the numerous other craft

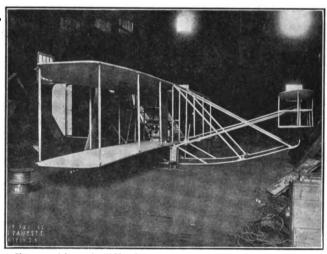
smiths will get together—will co-operate—will organize, you can solve every one of your craft problems, can lift every craft burden. Pull together—in union there is strength—strength to lift the burdens of low prices, incompetent workmen, long credits and dishonest debtors from the shoulders of deserving workers.

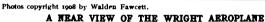
We want men—determined men in all sections of the country to take up this organization movement. We want men who will start the organization ball moving in their counties and keep it moving until we roll up a big national association that will reach its protecting arms from ocean to ocean.

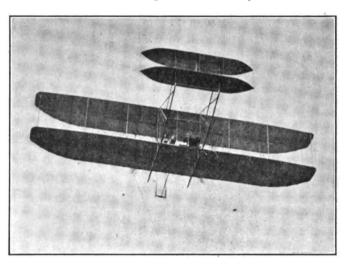
Will you, Mr. Reader, help in this movement? If I send you an easy plan by which you can secure for yourself

The old forgers of the swords were craftsmen who held their secret from the rest of the world. A Toledo blade was famous for its keen edge and great strength. In Japan the old art of sword making is said to be still preserved, but whether the secret was obtained from Toledo or Damascus is not known.

"If they could forge such swords a few thousand years ago why should not the secret be known and utilized to-day?" Thus undoubtedly thought one of our steel companies. So they sent an expert to Japan. This expert scoured the Flowery Kingdom from one end to the other and reported: "There are some wonderful samples of old swords which possess remarkable strength and elasticity. I tried some







THE WRIGHT AEROPLANE IN THE AIR

problems are other burdens. Did you ever think of them in that light, brother? Did you ever think that the craft was just about down and out in your locality? Did you ever wish that you had learned brick laying, carpentry, plumbing or any one of the hundred trades that get what they deserve? Did you ever think that the blacksmith was just about the most abused craftsman on the face of the earth? Did you ever think that the trade was about the worst you could get into?

The smithing craft itself is O. K. There is no better trade on earth than blacksmithing. The trouble lies entirely with the members of the trade. They are unorganized. That's why you're not getting the prices you deserve. That's why you're not making the profits you should. That's why you don't understand your competitor and are continually fighting him.

The solution of the problems—the lifting of the burdens—will come through organization. If you and your brother

and your brother craftsmen better prices, harmony and co-operation, will you put your shoulder to the wheel? Will you drop me a postal card request for my plan? It's free. It wont cost you a cent beyond the postal card. Let me have your name and address today. WRITE RIGHT NOW.

THE SECRETARY,

P. O. Box 974, Buffalo, N. Y.

The Secret of the Toledo Blade.

Today scientists, experts and manufacturers are devoting time and money to improving the quality of their products. Laboratories, expensive equipment and material and every facility for testing and experimenting have been placed at the disposal of our most learned scientific experts, and yet withal there are some things in which the ancients excelled us.

"In Damascus," says a recent writer, "the art of steel making reached a high stage of development long before Europe even dreamed of such a hard material. of these on ordinary hand-forged American steel and they actually cut our material in two. But nowhere could I find anyone who knew how or where they were made. They all seemed to be of ancient origin. I doubt very much if such steel is forged today in Japan. It is apparently a lost art, and as I could not secure any of the old swords for testing I could not apply an analytical examination of the steels."

The search however continues. In the laboratories of the entire world experts are testing, experimenting and searching. The chemist mixes and remixes elements in his crucible to make a harder or a tougher or a softer or more elastic metal. And, who knows, but that we may in time discover this lost art and produce even finer and better blades than the early sword-makers.

And so it is also with other socalled lost arts. The world continues to search and experiment, and while the ancients had no telephones, railroads or the thousand and one other present-de-

conveniences, they still excelled us in some things. The peculiar plaster or cement used by the mason of early days has in many cases withstood the centuries—and we cannot produce anything as good. The dyes used on the rugs of our forefathers it is impossible to duplicate.



An enlargement of the cylinder bore usually means an expensive item in a repair bill and the outlay is usually objected to by the car owner. However, you can restore full compression to the cylinder, save your customer considerable money and yourself appear in a very favorable light. The wear in the cylinder will be found high up in the cylinder, while the bore at the base is as originally. To restore compression, fit new piston rings of slightly larger circumference, and see that the new rings are made with long step cuts instead of diagonal cuts. If rings of this kind, as is usually the case, are of greater thickness than the old grooves, wider grooves will need to be cut. However, when new rings are fitted in this manner, compression will be fully restored.
A. T., New York.

How Automobile Tires Are Made.

The making of tires is one of the most interesting phases of the automobile industry. The advances made in this particular branch of what has come to be one of the greatest factors in American industrial life in truth are amazing.

Automobile tires are made in three ways, or rather, two distinct ways and a combination of the two. These two ways are "moulded" and "wrapped" tread, and all tires may be divided between these classes with one exception, which combines what are said to be the best points of both.

The "moulded" tire is built up layer by layer on an iron core. Over it is clamped an iron mould. It then goes to the vulcanizers. Here heat expands the rubber, creating enormous pressure inside the mould, which forces a perfect union between the layers of rubber and fabric which go to make up a tire. This pressure is so tremendous that a two inch cube of rubber enclosed in a cast-iron mould with walls two inches thick will crack the iron when subjected to the heat of the vulcanizer.

The weakness of the process lies in the fact that the building up of the fabric and rubber piece by piece is an operation requiring skill and dexterity. If the strips of fabric overlap ever so little—there's a ridge. If they fail to meet by the fraction of an inch—there's a hollow. These ridges—hollows—irregularities—are said in the curing to become hidden weaknesses and defects, because of which one "moulded" tire will last only 1,600 to 2,000 miles, while its mate stands up perfectly for 12,000 to 15,000 miles of hard riding.

The "wrapped tread" tire is built up layer by layer on an iron core in the same manner. But before curing the iron core is replaced by an air bagan extra strong inner tube. And instead of being clamped in a mould it is wrapped about with many layers of strong tape and is then cured (vulcanized) in live steam. The compressed air in the air bag smooths out all the irregularities in the layers as your hand smooths out wrinkles in a garment—there can be no hidden ridges or hollows to induce blowouts and cut down the mileage. But it does not give the terrific squeeze that the moulded tire gets—thus lacks cohesiveness and unity-loses durability and strength.

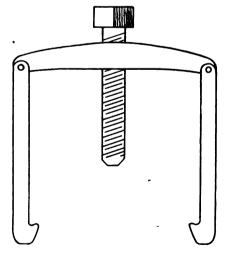
Besides these two methods of tire making there is also the combination of the two. The tire is first put on the iron core, clamped in the iron mould, the same as the "moulded" tire, and enclosed in hydraulic press vulcanizers, surrounded by live steam until the rubber has expanded to the utmost—until the squeezing has reached its limit.

Then before the rubber has fully set while it is still plastic—it is removed from the vulcanizer and carefully inspected, the tread applied, the iron core is replaced by the air bag, the iron mould by the winding of heavy tape, it is inflated on a rim, put back into a vulcanizer and left until the curing process is complete.

The iron core and the squeeze weld the tire into an inseparable whole. The air bag then smooths out any wrinkles, furrows or irregularities which may have been hidden from the inspector's eye. The result is said to be that the tire is as firmly knit together in all its parts as the best "moulded" tire and as free from hidden defects as the best "wrapped tread" tire.

How to Make a Wheel Puller. F. J. FIELDING.

Automobile wheels and motor fly wheels are seldom easily removed and, as a sledge hammer is not just the proper thing for simplifying their removal, a special tool is necessary. The engraving pictures a device that will greatly simplify the removal of wheels that are tight on their shafts and it will cost little to make. The device consists of a bar of metal long enough to reach across the wheel hub or, in the case of the fly wheel, across the face of the wheel. This piece is drilled as per the illustration; a hole at each end and a large one through the center at right angles to the others and threaded. A good, stout bolt, with a square head or an eye for turning, is placed in the



A WHEEL PULLER IS EASILY MADE

center hole. Two arms are forged, as shown, and one hinged at each end of the first piece. In use the hooked arms are caught behind the hub of the wheel while the bolt is run up against the axle. A turning of the bolt will now gradually pull the wheel off.

Pullers built on the above plan are also used for removing fly wheels, gears

and other wheels that are driven tight upon their shafts. The gear puller is made with a shorter cross beam, though the arms will need to be as long or longer. The fly-wheel puller may be made with shorter arms and also a shorter cross beam.

The Cadillac Four-Cylinder Twenty-Five Horsepower Car.

The Cadillac four-cylinder, twenty-five horsepower car is made in the roadster, touring car and limousine type, and is known as their model G. The motor of this model is shown in Fig. 2, with the right side toward the observer. A good view of the power plant may be gained from this picture. In Fig. 1 is shown a view of the motor from the front end of the car and looking toward the dash. It will be observed that parts of the cylinder wall and other sections have been cut away so as to give the observer a better idea of the parts.

The transmission of the model G. Cadillac is shown in Fig. 3. The gear case is located beneath the seat and footboard of the car. The reader can from this picture gain a good idea of the set of the gears, and if the other descriptions of motor cars have been carefully read one will find no difficulty in picking out and tracing the various operations of both the motor and the transmission shown.

A description and explanation of the Cadillac single-cylinder car will appear in an early issue.

Adjusting, Repairing and Caring for an Automobile.—5.

If plenty of oil is applied to the rear axle parts there should be no trouble during the natural life of the gears. Of course, like all other parts of a machine, these parts will wear out in time, and when there is such excessive play that the gears do not mesh true the gears should be replaced. Under ordinary circumstances an inspection every six months should be sufficient and as in all matters a stitch in time saves nine.

The differential will generally stand pretty rough usage, but some drivers are accustomed to apply brakes so severely as to slide the wheels. This practice will now and then break a spider, and for such usage no amount of metal in this part will be an adequate safeguard.

Rear hub brakes are intended to perform the function of emergency brakes, as their name implies, and consequently they take hold severely. Used only in emergencies they should outlive the rest of the car. Many theories to the contrary notwithstanding, the transmission brake is not injurious to the driving gears if used judiciously, as every other part of the car should

be used. And inasmuch as this brake equalizes the forces between the two rear wheels uniformly, is more easily lubricated, inspected and adjusted, it is better practice to use it for service than the hub brakes

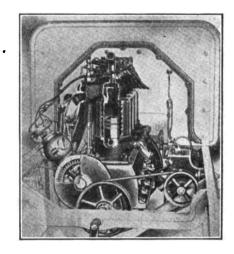


FIG. 1-THE CADILLAC MOTOR FROM

To detach the rear axle, jack up the frame, disconnect the springs from the spring blocks by removing nuts and spring clips. Remove the nuts which hold the two sections of the ball socket together. This allows the ball to be drawn away from the transmission frame Disconnect the brake connections and the axles may be removed from under the car.

To dis-assemble the rear axle, remove the wheels by unscrewing hub cap, using special hub wrench. Drive out pin and if key can be gotten hold of with pliers withdraw key first. Using wheel puller or similar device, pull wheels off. Disconnect drive shaft tube by removing nuts on front ends of the radius rods; remove nuts from studs which attach torsion tube to the differential housing. Draw away the tube. Remove bolts which hold two halves of differential housing together. The housing may then be drawn apart, exposing the differential.

Care should be taken to note the position of each part, such as thrust washers, roller bearings, etc., so they may be accurately re-assembled.

If necessary to dis-assemble differential gear any person with the slightest mechanical knowledge can readily see how it is done when it has been exposed to view. Great care should be taken to get every key and pin and bolt back in its exact position.

In order to make a "fool proof" and absolutely reliable job the drive pinion is keyed onto the shaft and the end of the shaft riveted over. Inasmuch as



THE JEWEL RUNABOUT-SINGLE CYLINDER, 2 CYCLE, 10 HORSEPOWER

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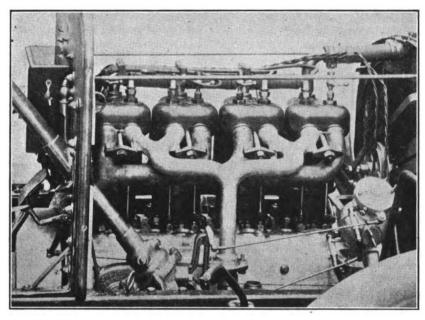


FIG. 2-A SIDE VIEW OF THE CADILLAC POWER PLANT

the average shop will not have facilities for accurately replacing pinion and making sure that it is in perfect alignment it is advisable to replace the entire shaft and pinion when the latter becomes too much worn for safe usage. This is best also because the shaft will likely have become worn at its bearings. If, however, it is desired to replace the pinion only it may be removed from the shaft by cutting away the edges where riveted over and driving out the shaft.

In replacing, rivet over the end of the shaft as well as possible and be sure that the gear is on perfectly straight, as otherwise it is sure to cause trouble and perhaps incur a larger bill for new gears than would pay for the complete shaft and gear in the first place.

Should the driving pinion be loose on the shaft order a new key, as the key has become worn and if allowed to go is liable to shear off and cause trouble.

Noise in the axle driving gears usually indicates wear either in the gears, in the thrust washers or the bearings; inspection should be carefully made to ascertain the cause as soon as an unusual sound is heard. Another cause which may produce the same effect is a sagging of the rear axle, due to continual jolting over the roads. This can be corrected by tightening up the truss rod. To do this remove the rear wheels; loosen the nut on the inner side of the

brake flange and tighten up the nut on the end of truss rod. As the truss rod will stretch more or less it is advisable to watch this carefully, tightening occasionally, at the same time being careful not to strain it so severely as to force the axle out of straight in the opposite direction.

To remove master bevel driving gear cut off rivets holding gear to flange on differential case with cold chisel, being careful not to rupture the flange. In the later cars the gears have holes $\frac{1}{82}$ inch larger than those in the earlier ones and take a rivet that much larger. If you find the holes in differential case too small, ream out to the size of hole in the new gear. A good plan is to use the gear as a jig so that the holes will register.

The master gear will wear longer than the pinion, ordinarily, although there are exceptions to this rule. When the gear teeth begin to "pit" it is a good plan to renew the gear, as the pitting shows that the casehardened shell has worn through, exposing the soft metal.

In the event of a rupture of the differential housing or brake flange it is advisable to replace the entire half of axle housing for, unless you have experience and first-class facilities for doing this work, you are liable to damage the casting and tube by trying to cut off the rivets and replace the cast section. This damage may not show up at the time but is liable to cause trouble later. In ordering be sure and specify which half is required, left or right—the right being that on the driver's side of the car.

To remove babbitt bushing from drive shaft tube—If properly lubricated at all times these bearings should not require replacement more than once in two years. However, should the bearings run dry and cut sufficiently to allow of play, it would be economy to replace them. Take $\frac{3}{4}$ -inch or $\frac{1}{4}$ -inch round steel bar about 4 feet long—or a few inches longer than tube—insert from opposite end of tube and drive bushing out. A wooden mallet is better than a hammer for this purpose.

To insert new bushing, rest one end of tube on a solid wood block, and drive the bushing in, using a wooden block also to cushion the blow so as not to mar the bushing. Of course, if a press is available the bushing can be more easily forced into place.

The shaft will be a tight fit in the new bushing and it is proper that it should fit as tightly as it can be pushed in by hand.

When in place it may be found that the shaft—unless also a new one—will

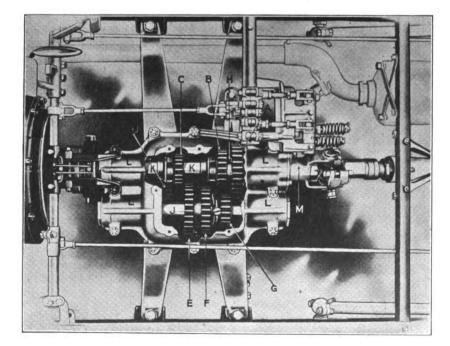


FIG. 3-SHOWING THE TRANSMISSION GEARS OF THE CADILLAC FOUR-CYLINDER CAR

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have worn slightly at the bearing section, and so it will be a loose fit even though the larger part of the shaft goes in tight. If excessively tight when in place it will be liable to run hot. This tightness may be caused by a slight variation in the diameter of the tube, causing the babbitt bushing when forced in to slightly compress. If necessary to relieve the bearing scrape the babbitt bushing carefully or, better still, use a one-inch hand reamer, being very careful not to make the hole so large as to allow the slightest play.

To disconnect universal joint from drive shaft—Remove two plugs from top and bottom sides of ball casting. Revolve shaft until pin comes opposite hole; drive out pin and draw universal joint away.

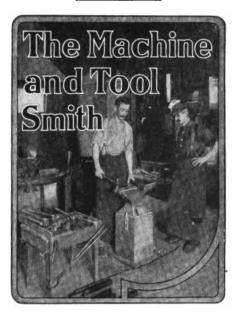
Wear in the universal joint may be taken up by disconnecting the two halves, cutting off the rivets with a cold chisel and carefully filing or turning down the faces so as to allow them to come together. The hole will not then be perfectly round, and should be carefully scraped or reamed to fit. Excessive wear in the steel parts calls for replacement of these parts.

If rear axle or wheel is sprung by skidding against a curb, or other accident, it is false economy to drive it. Tires, gears and all other parts will suffer and the bill for repairs will grow daily. If axle shaft is bent it is better to get a new one than to try to straighten the old one.

Every repair man should have a wheel puller. A tire can be removed easily and more carefully repaired and replaced by removing the wheel, and there are many occasions when it is necessary to remove the wheel. A good puller is cheap to buy or can be easily made. Some make a threaded cap to screw over hub cap threads.

Directions for the making of a good wheel puller are given on a previous page in this issue. Those readers taking up automobile work will do well to supply themselves with one or two of these devices.

(To be continued.)



Don't use Bone for Caschardening Steel when brittleness is objectionable in the finished piece. Bone contains phosphorus and this, when present in steel and combined with carbon, makes the metal brittle.

H. W. J., Ohio.

Here is a little kink for pulverizing borax.

so many smiths and tool makers dread
the job. Take a tin can that is convenient
and a 1½-inch gas pipe and go to work and
you will find you can do a better job and
do it quicker than the old way with a
hammer.

ELMER REED, Illinois.

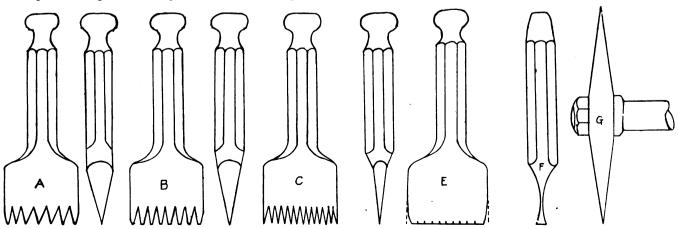
Dressing Stone Cutters' Tools. J. C. LAMON.

A practical way to dress stone cutters' tools is as follows: For tooth chisels, first forge out to required thickness. This is determined by the hardness of

the stone which the tool is to cut. It must be borne in mind that a tool forged and tempered to cut sandstone would not do for granite or Oolitic limestone, so the smith must determine what style of tool is required, then forge to suit the class of work. For very hard granite a tooth chisel should be made rather heavy and the teeth are cut as at A. The teeth for cutting sandstone are also left heavy but not sharp, as shown at B. For Oolitic limestone and soft marble the tool at C is about the usual shape.

I will endeavor to briefly describe three practical methods of making and dressing stone cutters' tools. One of the very best methods is as follows: If one has a power emery wheel the teeth can be sawed out by having a special saw made which is not expensive and is one of the quickest ways to cut the teeth. The saw can be made at any machine shop as follows: Take a piece of tool steel and forge, anneal and then finish it in the lathe to about eight inches in diameter and 3-inch thick at collar as at D. It is then placed on emery wheel spindle and you are ready for business. When cutting the teeth the saw should be run up to about 2,000 R. P. M. Now dress a number of tools and allow them to cool. The teeth are then spaced with a small three-cornered file, then taken to the saw and cut out. The shape of the saw finishes the teeth when the proper depth of tooth has been reached. All that is necessary now is to dress up on emery wheel and temper.

To cut them by hand have a large number of cutters made as shown at F. They are forged with plenty of clearance so they will not stick. When cutting a tooth, use heavy oil to cool cutters. Have it near at hand and keep your supply of cutters in oil. Have all your blanks spaced with a small three-cornered file, as this serves as a guide when tool is hot. When possible, whether sawing, punching or cutting by hand, forge a large number at a time, as you can get along so much faster



THE SIZE AND FORM OF THE TEETH DEPEND UPON THE STONE TO BE CUT

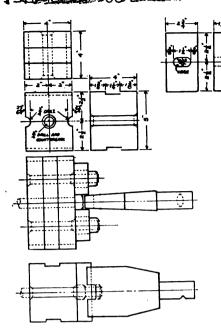


FIG. 2-A BOLT HEADING DIE

with each operation. After you have forged blanks and shaped them up they should be spaced with a small file. The blank should look as shown at E. The cutting operation will force edges out to dotted lines. Put several tools in fire and heat slowly; keep tools just hot enough so it will keep you busy cutting. When hot enough take tool in vise, tighten up on it and cut teeth, using a light hammer. After all teeth

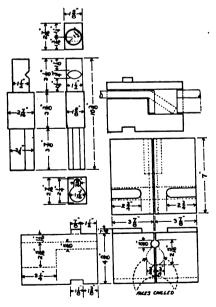


FIG. 1-FOR MAKING HAND-HOLDS

have been cut dress up on emery wheel and then finish tooth with a small knife file to required shape.

The punching method requires a simple bench punch. There are several makes. All are good. All that would be required would be to make special punch and die, like style of tooth that

you wished to punch. It will be found, however, that the punching method tends to crystalize the teeth and they

Tools and Formers for Bull-dozers and Steam Hammers—2.

soon break.

G. M. STEWARD.

There are at the Milwaukee shops of the C., M. & St. P. Railway Co. three Ajax forging machines, 4, 2 and 1½ inch respectively. On the 4-inch machine they make from round bar iron a hexagon lock nut, one of these being completed in a single operation. On the 4-inch machine they make 13-inch standard nuts, thirty of these being turned out per hour. Also on the 4-inch machine is made a foot for front end braces, this requiring two operations. The first is made in the header, the second in the dies. These feet are made from 21-inch round iron and the output is fifteen in ten hours. Plans of these dies are furnished by Mr. Bennett.

Fig. 1 shows in detail a die for the making of \(\frac{1}{2}\)-inch round hand holds or grab irons on the 1\(\frac{1}{2}\)-inch Ajax upsetting and forging machine. These dies are made of cast iron and are put in service just as they come from the foundry, without machining, and are good for from 10,000 to 12,000 grab irons.

Fig. 2 is a bolt-heading die which can be applied to any style of bolt or forging machine from 5 to ½ inch. When this die was first installed at the M. C. shops steel was used in its construction and 5,000 to 6,000 bolts could be made on one pair. After changing the style of this die, making the side blocks adjustable and using cast iron, 81,000 7-inch bolts were made with one pair and 100,000 2-inch bolts with another, all of these dies being good for more and none of them having been in the machine shop after being machined when new. Mr. Mayer at the M. C. shops also has in service various other styles of dies such as for the making of brake pins, upsetting and hot punching dies, all made of cast iron.

The following described devices are in service at the P. R. R. smith shop at Altoona, Pa. Fig. 3 shows in detail a former for bending running board brackets for box and refrigerator cars.

These brackets are made from one half by one and one half inch material, cut 22½ inches long. With the wings of the former standing open, a piece of material is placed in position and each motion of the machine forms a complete bracket.

Fig. 4 shows in detail a former for bending brake shaft brackets for XL box cars. These brackets are made from three eighths by one and one-half inch material, cut 14½ inches. A piece of this material is placed in position, wings of former standing open, the

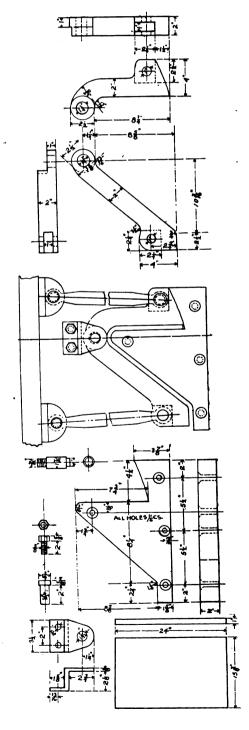


FIG. 3—FOR BENDING RUNNING BOARD BRACKETS

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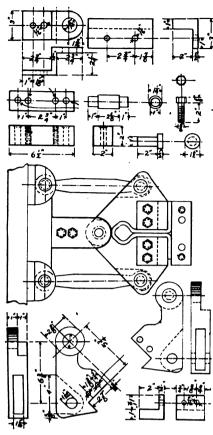


FIG. 5—FOR BENDING BRAKE SHAFT BRACKETS

process being the same as described in connection with Fig. 3.

Fig. 5 is a detailed drawing of a former for bending brake shaft brackets for GL cars. These are made from three eighths by two inch-material, cut 197inch long and the operation is the same as described in connection with Figs. 3 and 4. These formers can be applied to either bulldozer, air press, forging or bolt machine, or could easily be applied to a steam hammer. It is the practice at the Altoona car shops to use these formers on a temporarily constructed air machine which is described in Fig. 6. It will be readily seen from this print that this makes a very cheap bending machine, which almost anyone can use, providing a supply of compressed air is at hand

Fig. 7 gives in detail a former for bending brake beam safety hangers for the wooden type of passenger cars. This former has proven a great laborsaving device. It is used on a bull-dozer. With the machine standing open, the wings of the die drawn back, a piece of metal one half by two by forty-nine inches is laid across the former between the arms and center block and one revolution of the machine forms a complete hanger.

NOTE.—The first installment of Mr. Steward's paper on "Tools and Formers

for Bulldozers and Steam Hammers," together with photographic illustrations of some of the formers detailed, appear in the February issue of THE AMERICAN BLACKSMITH.

The Smith and His Work-2. ROBERT B. KERR. The Hollow Fire.

When a number of pieces of considerable size are to be welded the hollow fire will be found convenient.

Clean off the forge, procure some shavings and a number of small blocks of hardwood, varying in quantity according to the size of fire to be built. Pile the shavings and wood blocks neatly up over the blast-pipe opening. pile clean coke over the wood. Have the coals moderately damp. Begin at the sides and pile over all until it is completely covered, packing the coal firmly, leaving only a space at the front to admit of the work being freely handled. Light fire with a hot rod and let it burn up slowly. By the time the wood is consumed the roof will be sufficiently charred to stand up and you will have a good fire. Use foundry coke half and half if available. A hollow fire properly built and maintained will last for two or three days. It cannot, of course, be used for work that has to be pushed through the fire.

A Tempering Fire.

The forge is *not* the proper place to do particular tempering work, and in these days of convenient tempering

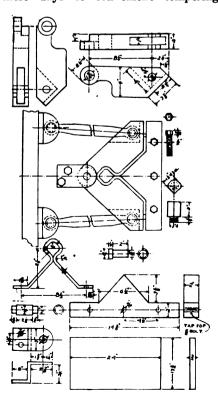


FIG. 4-ANOTHER FORMER FOR BENDING

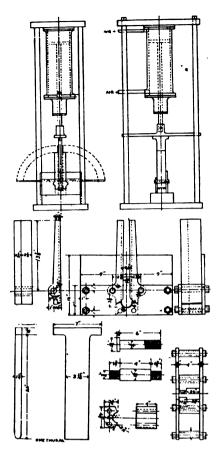


FIG. 6—AN AIR MACHINE USED AT ALTOONA SHOPS

furnaces, both coke and gas, there is little excuse for having this work done in the forge.

The first essential to successful tempering is that the piece be heated absolutely uniform throughout, and be kept as clean as possible. It is next to impossible to do this in an ordinary fire, but as it is quite a common practice to send such work to the forge, so it is up to the smith to do the best he can.

Build a wide fire—If a single large piece has to be hardened make the fire wide enough to admit it freely. If small work is to be treated, such as punches, etc., several of them can be under way at one time.

Let the fire blow up clear till free from smoke and gas, packing the coke down until you have a glowing bed of it (the thicker the better) between the blast and the work on hand. Use a sheet-iron top on the fire to confine the heat as much as possible or, what is perhaps better, pieces of hardwood plank, if such are available. Disturb the fire as little as possible and heat slowly.

For heating taps, reamers, spindles, drills, knives or any similar work use either a fire-clay muffle, or procure a piece of tubing, amply large, plug one

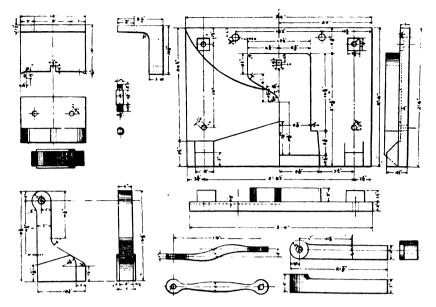


FIG. 7-A FORMER FOR BENDING BRAKE BEAM SAFETY HANGERS

end, lay it across the fire and cover over. Now, bring heat up slowly so as not to burn the pipe and turn the work frequently, to insure a regular heat. This plan is invaluable for all fine tools with cutting edges or threads.

Tempering will be treated in a subsequent article.

General Instructions.

The young smith, also the old one for that matter, should cultivate the habit of keeping his surroundings as clean and tidy as possible. The forge should be kept clear of unnecessary tongs and is certainly not a proper receptacle for scrap.

After using tongs or other tools always make it a point to have them replaced in their proper racks. It is just as easy to find them again when needed—and it looks better.

Improve every opportunity to keep tools in good repair and replace them promptly when worn out. Always have a sharp chisel or two convenient to your hand.

Do not let the heads of flogging tools batter down; it is dangerous; stop and redress them. It will only take a few minutes and may save an eye.—Tools can be replaced, but eyes—never!

Do not leave scrap scattered around on the floor, have an iron box or bucket for it. It is not exactly ornamental lying around and does not sweep up worth a cent.

In starting on a job see that you thoroughly understand the drawings, model or oral instructions you receive before starting in. Failure to do this will often lead to trouble later on and a consequent loss of time and temper. Be sure you are right, then go ahead.

Cultivate the habit of endeavoring to picture in your own mind the job as it should appear when finished. and work accordingly. The different operations will then unfold themselves to you without any trouble. Try this, and you will be surprised how much sooner and easier your task has been accomplished. A gentleman once remarked that the sculptor's art was easy to learn. All a person had to do was to hew away the pieces of marble, he didn't need to form the statue, and the job was done. This is indeed all the sculptor does; but before using the chisel he must have in his mind's eye a clean-cut picture, complete in every detail, of his masterpiece. With the artist it is the same. The designer sees clearly every detail of the new machine before he transmits his ideas to paper, and the same applies in like measure to the successful blacksmith.

In many shops the smith has to cut up his own stock. Get the habit of measuring up the job carefully, and cut off just as much as will be required. A little practice will make you surprisingly proficient in this, and will save time and steel. If you have a number of pieces to make, and are at all doubtful, cut one off and finish it. You will then know exactly where you are at.

It is an axiom that to be successful in any enterprise or calling you must also be dilligent. This also applies to the craft of the smith. Keep your mind on your work. You will accomplish more, do better work and do it easier than by any other known method. Try it.

In working on a job which necessitates the tongs being in the fire part

of the time always cool them off before working the heat; too many smiths neglect this. Tongs are of no value in holding a job rigid if they are hot.

Never, under any circumstances, take a heat to a power hammer with either a hot or a misfit pair of tongs. A few minutes spent in making the tongs fit snugly on the job may save you a broken head.

I almost forgot to mention that an indiscriminate use of profanity, even in season, is not absolutely necessary to a successful prosecution of blacksmith work.

Although a pyrotechnic display of sizzling adjectives and proper nouns on the occasion of a lost heat or other mishap is a highly spectacular and entertaining performance to all those within hearing, it will not remove the cause of the trouble and doesn't usually improve the helper's temper any; while the angry, glowing fire and the sullen, tough steel, being governed by laws of their own are not influenced thereby in the slightest degree.

(To be continued.)

The Apprentice Question-2.

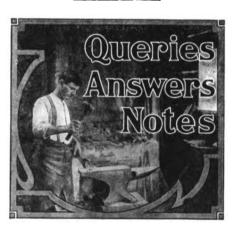
DAYTON O. SHAW.

Let me now turn from the difficulties of learning all the branches of the trade and consider specializing work. It seems to me that as work is specialized at the present time it is an injustice to the man and to the trade. Do not misunderstand me. I believe that specializing work might be so arranged as to better the condition of the man and also be an uplift to the trade. It has been brought about partly by the manufacturer, because an employee will do more if he is kept on one kind of work. Now, it is an injustice to a man to have some one specialize his work for him; it is justice to a man to specialize his own work. An all-around smith will specialize. He can't help it. There will be one kind of work that he will take more pride in doing than any other. I have in mind two toolsmiths. One held his job by being a good forger, even though his wages would not pay for the steel he spoiled. The other kept his position by never spoiling any steel. He would not spend so much time on his forging but give more of his time to his tempering work. He would take as much pride in doing a good job of tempering as the other man would of forging. Neither of these men could give perfect satisfaction; but change them, that is, give all the forging

to one and all the tempering to the other, then you have two ex-This perts in those two branches. would be justice to the men and to the trade. Here is another illustration. Take two men who seem to have equal intelligence and ability and apprentice them in a forge shop. After a little time one draws ahead of the other and gets the best work and the most pay. Take these same men again and apprentice them in horseshoeing. The man who was first in the forge shop now takes the second place in horseshoeing. One can readily see it would be an injustice to the good forger to keep him at horseshoeing, and it would be an injustice to the horseshoer to keep him forging. We might go on and multiply instances where a man takes second place, not because he is a fool but because he is not in the right place. The manufacturer does not care how much a smith knows and he is perfectly willing that he should specialize his own work. The question is, how can a smith do this when he learns only one or two branches of the trade; how is he to know which he is best fitted for?

Again, the apprentice does not receive proper instruction. There are, of course, exceptions to this rule, as in the case of Tom Grady. Tom has long since passed over the Great Divide. but his good deeds stand as a monument to his memory. When on earth he kept two men and one apprentice. Whenever the apprentice went to another shop for a job and made known the fact that he had served his time with Tom Grady, the employers would say, "Well. then, take off your coat and go right to work." Tom was known for miles around as a first-class mechanic and the men whom he sent out were thorough in all branches of the trade. Three vears with Tom Grady was all the reference one needed where Tom was known. There are few smiths, however, of this type. Some tell the apprentice only what they are obliged to, to get out their work: others, like my friend Jack, to whom I have referred before, do not understand their work and consequently cannot teach what they do not know. And again, some smiths are not good teachers. They have not the faculty of explaining what they know or of interesting the pupil. A college professor once said that teachers were born, not made. I think this will apply to this case, for the man who has charge of an apprentice is really a teacher, and is it not just as important to have the best instruction in learning a trade as it is in learning a language? Besides, is it

not often true that the apprentice is misjudged because the smith who has him in charge does not understand the different natures and temperaments of men. He may give credit where it does not belong and discourage those who would do well. We often hear the expression, "That fellow can't learn, he is too slow," but, "This one is all right, he is quick to catch on." Sometimes a young man comes into the shop and he seems to learn very rapidly until he reaches a certain point and then seems to stop. The fact is, he is an imitator. He can do the things he sees the smith do, but when he gets to the place where he needs some head work he is confused and seems to go backward. With the right training, however, he can be taught to think and study out his own work. Now, the one who is slow to learn keeps digging away, working with his head as well as his hands. He catches up with the one who was quick to learn, goes past him, and eventually becomes the best mechanic.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants Prices on Sleigh Work.—I wish some good brother wagon maker would give the prices and the standard width of light bobs and of cutters. I do not know the standard width. E. E. Bills, Minnesota.

To Prevent Paddling.—I would like to ask some good brother smith to tell me through your valuable columns the best way to shoe a horse to keep him from paddling.

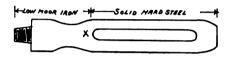
D. E. CRUM, Illinois.

That Well Jar Again.—Mr. L. R. Swartz did not understand my query regarding jars for well boring. I have been making the kind described by him and other sorts for years. What I want was information on how to make solid-headed hard steel jars. Understand, I only want to have one weld and that at the box or pin. I will try and describe what I mean by a rough sketch. No welds to be in head and but one weld only at X. W. Dearness, Queensland.

An Ornamental Flower Stand.—I would like to know if any of the brothers have an artistic iron flower rack that they could send to be illustrated in "Our Journal." I will be ever so much obliged.

GEORGE MCKENDRICK, Ohio.

Two Handy Vehicle Tools.—The accompanying engravings show two handy tools that most any vehicle worker will find very convenient. One is for pulling broken spoke tenons out of hubs, while the other is for putting on buggy clips. To make the tenon puller use a ½-inch lag screw and weld a rod to the head end of it after turning a loop or eye on the rod. In use, bore a ¼-inch hole in the broken tenon, screw in the lag screw. When the lag screw reaches the box keep turning and the tenon will climb the screw. The tool for putting on clips was made from an old buggy top iron. Forge a



THAT WELL JAR AGAIN

hook on one leg of this and a fork on the other end. Its use is self evident and needs no explanation.

J. W. Seay, Texas.

To Temper a Plow Share.—I would like for some brother smith to tell me how to temper a plow share so as to make it hard and tough. Would like to know the best kind of bath. I live in a country where there is lots of clay soil and a good many rocks.

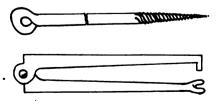
FRED W. RICHEY, Illinois.

A Boat Railing.—In putting up a railing on decks of boats or ships of two-inch or one-inch shafting, it is one half an inch too short. I dare not draw it for it will make thin spots in it, and spoil the looks when polished. How will I get that half inch without welding? W. W. Wence, Iowa.

Wants a Weekly.—I like Brother Collum's idea of two papers a month. A weekly paper would suit me a whole lot better. As I do nothing but horseshoeing I would like to see more of that in it, but I think I am getting my money's worth, and then some, as it is now. One issue is often worth more than the whole year's subscription price.

Bert Ehly, Illinois.

Removing the Stuck Pulley.—In reply to G. W. H., of New Hampshire, I will say, heat the shaft to a dark red until the shaft gets larger and expands in the hub. Now cool the hub and shaft with water and you can move the pulley with your hands. Use a good blow torch to heat the



TWO HANDY VEHICLE TOOLS

shaft. The more you heat the hub the tighter the hub sets. I have had trouble this way.

O. R. Manville, Missouri.

The Horse that Interferes.—When I get one that hits with the heel I turn a side

calk on the inside, and if with the toe I make the shoe about straight, and in all cases keep the foot as near level as possible, and I very seldom fail to shoe a horse this way. I do not believe there can be too much said about horseshoeing in our paper. I am a young smith with eight years of shop experience.

Elmer Reed, Illinois.

Shoeing the Interferer.—Brother Daniel Johnson wants to know the best way to shoe a horse that interferes. I will give my way and I have never failed to stop horses that others have failed on. I first pare the foot all it will bear and make sure that I get the foot plumb. Then get a shoe that will fit the foot all around and leave out the inside nails at the toe as most of them strike with the toe. Drive the nails as high as is safe to go and then clench tight and dress off.

A. T. Wright, Texas.

To Cure Canker.—In reply to Mr. J. Piercey of Ontario in the January issue of The American Blacksmith will say I have a remedy for canker. Take of Calomel powder one ounce, and muriatic acid one ounce, and mix together and let it settle, the powder going to the bottom. Put the liquid on the affected parts, then dig the powder up from the bottom and smear over it. One application is sufficient. That will kill the germ. It is then well to use a mild salve.

Chas. Campbell, Indiana.

From Southwestern Missouri.—Our shop is 25 by 30 feet. We do general blacksmithing, including horseshoeing and woodwork. We are always busy; if we don't have work on hand we put up work ahead. We have two forges, two drill presses, two vises and all that it takes to constitute a first class shop. Our tools are all new and we can turn out work at a good speed. Our work at this time of the year is principally horseshoeing and wagon work. We guarantee all our work to be first class and have a good trade. Chas. Rowe & Son, Missouri.

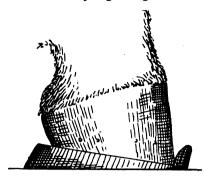
The Mule that Walks on Its Toes.—Brother Elmer Perkins wants to know if some brother can give him some advice on how to shoe a mule that, he declares, walks on its toes on account of hard pulling. In reply I would say that the animal has himself onto his toes. Send him to the green pastures until he has come back to his original self. I have had twenty years' experience at the trade and have had all kinds of feet to handle, but this is the best advice I can give.

W. Burdon, Pennsylvania.

A Practical Bicycle Kink.—The following may be of some help to other smiths. I do a great deal of bicycle work, and especially welding new ends on bicycle cranks that have been broken off. At first I had considerable trouble making them hold good in the weld, but one day I discovered that if I filed the plating off it would stick very nicely. As nearly all cranks are nickel plated I file the plating off before making the weld, and since then I have had no trouble at all. I use Climax welding compound. Nicholas E. Koch, California.

To Shoe the Mule.—In regard to the question asked by Elmer Perkins, of Indiana, for a shoe for a mule that walks on its toes, I enclose sketch of shoe which I have used very successfully. I always take a front shoe, because it is wider at the toe. For the toe I take part of an old rasp and weld to the toe of the shoe and then I bend it so there

is one quarter of an inch space between the hoof and the toe. Make the toe about one and one half inches high and put high heels on the shoe and try to get a high heel on the

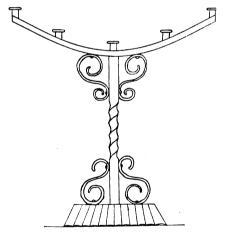


FOR THE TOE-WALKING MULE

hoof. Make the heels that high so that when he rests on the foot the heels are solid on the floor. After having used this shoe please let me know the results through "Our Paper." You don't need an extra toe on this shoe. It is best to use ten nails in the shoe. Charles Sheplar, Pennsylvania.

To True a Grindstone.—Will some brother smith tell me how to round up a grindstone which has worn off on one side? Also what tools are used. Gust Guettler, Texas.

In Reply.—A grindstone truer may be made of a piece of common gas pipe. The end of the pipe should be held against the face of the wheel with the idea of wearing down the high places. A rest should be



A HAND FORGED CANDELABRA

used in connection with the pipe so as to get the wheel true. The wheel should be turned at a fair speed and the high parts on the face worn down gradually by allowing the pipe to touch these places only. If the pipe is held rigidly on the rest, this is easily accomplished. J. W. J., Ohio.

For Cutting Teeth in Stone Chisels.—In reply to Mr. Daniel Johnson, of Kansas, will say: take some sheet iron about one-sixteenth-inch thick and cut out four circular pieces eight inches in diameter and drill a hole in center of each to take the emery wheel shaft, now put one on shaft, then put on a washer the thickness he wants his tooth on the chisel, then another dish and so on till he has the four plates of sheet iron on the shaft. Then fix a rest to hold the chisel and start your wheel. Place the chisel on the rest with the edge of chisel

against the sheet iron plates and the work is done in less time than it will take to read this article. He may think it very foolish, but it will walk right through the steel. Try it.

C. W. METCALF, Iowa.

About "Our Journal."-In reply to Mr. P. J. Collum's "What say you folks, in regard to our paper being published twice a month?" My request is four times a month and \$4.00 a year. That is how much I think of The American Blacksmith. Make it a weekly instead of a monthly. It would enable us to get our brothers' queries answered in so much shorter time. I will suggest that the Editor make a suggestion to that effect in the next issue and see how many of the readers are in favor of making "Our Journal" a weekly instead of a monthly. I would agree to write an article or answer some queries each week if we can make the change and I don't think there is a reader who would not be pleased to see the change. Now, let us hear from some one else on the subject.

C. W. METCALF, Iowa.

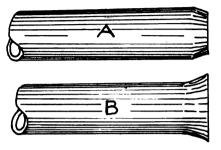
A Talk on Buying.—Couldn't we form some plan of doing away with the middleman's profits? If we could combine ourselves we could force them to sell direct to the blacksmith and thus save the profits for ourselves. I have read the advertisements of the manufacturers of supplies, but when you answer them they refer you to the jobber and then you pay two prices. I have thought of a plan that would be of great benefit to us as union smiths of every State. This plan is to build a co-operative concern and each smith buy so many shares in it and thus get interest on our money and still get our supplies cheaper than we could get them anywhere else. I hope other brother smiths will take up the subject and let us hear from them on the T. A. GRIFFITHS, Georgia. matter.

Hand Forged Candelabra.-The accompanying engraving shows a church candelabra which I made. I made four of those. They hold five candles each. The crescent is 20 inches over all with the five candles equally divided. The stem is one-half inch square, ten inches high, shouldered on both ends. The top end screws into the crescent with thimble screw on top of that. The other four thimbles are riveted on the crescent; which is \$\frac{2}{8}\$ by \$\frac{1}{8}\$-inch flat stock. The bottom is sheet steel crimped with a tinsmith's stove pipe crimper. It is round, seven inches in diameter and one inch high. The stem has a nut on the bottom side which screws the bottom up tight to the shoulder. There are four scrolls. They are riveted to the bottom and to the stem. The bottom of the stand is turned upside down and filled with molten zinc to give it weight and make it rigid. The top scrolls are riveted to the stem and crescent. The scrolls are one and three fourths by four inches over all. The stem is twisted for four inches in the middle. I painted them with gold paint, but when it dried it was like dull brass. I would like some brother, through "Our Journal," to tell me how to gild them so they will look P. J. O'CONNOR, Canada. like gold.

A Question for Mr. Johnson.—I am a reader of "Our Journal" and always get

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something from every copy that is of some benefit. I see in the January number on page 94 an article by Daniel Johnson, who says he has learned how to take the dish out of a buggy wheel without taking the tire off. I would like to ask Mr. Johnson to explain how he can do this through The American Blacksmith. It is something of interest to me and think it would be to every



HOW TO WELD BOILER TUBES

blacksmith if it can be done with success. I have always been able to put plenty of dish in a wheel, but have found no way to take it out of a wheel that has had the tire reset several times and dished a little each time.

G. A. CARPENTER, Indiana.

That Tight Pulley.—In reply to Brother G. W. H. of New Hampshire on how to remove a tight pulley the following instructions are given:

First, file and clean the shaft ahead of the pulley, then fill the holes with turbentine and keep it wet for about twelve hours, then heat the hub and get a large jack screw, a strong chain and a solid block. Then put the chain around the block and fasten the ends to the hub. Put the bottom of the jack against the block with the top against the end of the shaft. Now screw as long as possible and jolt with a heavy hammer. If it is not nailed on the shaft it will move, and when it once moves he can drive it out.

A. T. WRIGHT, Texas.

A Letter from Texas.—I get many good hints from THE AMERICAN BLACKSMITH, among them is the "Anvil Helpers." have made one with improvements over the one shown in January. Mine I made, in two pieces, the rest slides on main arm and you can adjust to suit the length of stock you are working. I use § square iron. I can also use it to hold tongs at my forge as it is in easy reach. By way of a side line I have a novelty. I am running a watch and jewelry store in connection. It pays well. I sell watches, clocks and jewelry of all kinds, also musical goods. When I am too busy in my shop my wife attends to the store. Let me hear from some other side-H. L. Hutson, Texas. line business.

Some Practical Hints.—I have never much time to write to journals, but I find time to read them. I have been in business in this place for twenty years and have had all the work that I was able to do with one man. We run our various machines by electricity.

I read Mr. Zimmerli's letter in the February paper but cannot quite figure him out. He don't say where he stands on debts. He started in on nil and now has a good shop, a store, a house, 38½ acres of land and a Minnesota farm, ten horses, four cows and one hundred hogs. He must have a gold mine,

To Sammie G. Goff of South Carolina, who

started in business at the age of 19, I would say that I admire pluck, but what can a man or youth do with five blacksmiths all doing business at close quarters? must be one or two in the bunch who are good mechanics. I would advise Sammie to go and work a year with one good mechanic and then another year with some other mechanic and never mind about high wages. Then he will see how work is done. Otherwise he will never amount to much. There is no money in repairing guns or fiddles. Welding, tempering, and brazing are all right, but I don't think much of brazing except at certain times and on jobs such as agricultural machines at harvest time when a farmer has to wait twenty-four hours to get extra parts from a supply house. All the talk and all the writing in books is not like practical experience. Of course, there are lots of times when other's ideas come in very handy, as from "Our Journal,"

How to remove pulley for G. W. H. of New Hampshire—heat the shafting on each side of the pulley, shaft will swell and then shrink. Remove pulley by twisting it around when it will come off easy.

As to welding boiler flues we do about 300 every year. First trim the flue and then scarf as shown in the accompanying engraving at A. Then cut the tip to needed length and scarf it as shown at B. Now put your tip over the flue and let it lap onehalf inch. Your tip should be warm when put over the flue, so that when it is cold it will be tight and can be handled in the fire. Put a little borax inside and outside and roll your flue. Tap the end with hammer to keep it from slipping off. Have a light hammer about the weight of a heavy shoeing hammer with an iron handle. Then keep turning your flue in the fire and keep tapping until it is welded. When you have done this take from the fire, clean off with a rasp and put on a prepared mandril. Now take your swage and have your helper hit it a few times with a hand hammer to smooth the flue down. You will now have

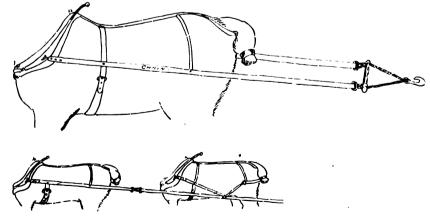
shafts, for if shafts are used the driver must go to the bother of unhitching his horse or mule every time he has to pull. The harness is of the very heaviest that can be had. The traces are made of three-eighths-inch chain, about seven and one half feet long, with a spreader of 3½ feet. The harness is like the common work harness. You take the trace in the middle or a few inches ahead of the middle and fasten it to the crouper: the front or short end is hooked to the harness and there is a tee on the other end of the trace that goes through the ring of the spreader. The accompanying engraving shows a set of mine harness for one horse and for two or more horses in one team.

We have no brakes on our cars; if we lower cars down an incline and the grade is too steep we have what is known as a "spragg." It is a piece of hard wood about eighteen inches long which the driver places in the wheel; if one is not enough two are placed in, or as many as are needed. Wheels are slid in this manner so as to insure safety. The "spragg" is made out of hard wood and the ends are pointed so the runner can place it in the wheel while the car is in motion. MINE SMITH, Pennsylvania.

Another Case of Seedy Toe.—I have a mule that has the worst case of hoof separation ever seen and he has got me sort of stumped. The mule is about five years old and had never been shod until last month. The inner part of the foot seems to be all right, but the outer hoof has separated from the inner and bulged off, leaving a space of about one half inch and extends about two thirds of the way around the foot. The cavity runs up nearly to the hair and strange to say he is not lame a bit.

D. G. Howorth, Mississippi.

In Reply.—The best way to put the foot into healthy condition is to remove all of the wall that has separated from the foot proper. Do this carefully and with a sharp knife. Don't allow any of the horn that has separated from the foot remain. Shoe



HOW TO HARNESS MINE HORSES

a clean job; no swell, no kinks. Now put in air-slacked lime to cool and to toughen it. There are other ways to do this kind of work, but I like this way best.

JOSEPH PEDLAR, Minnesota.

How to Harness Mine Horses.—In answer to the question of Brother Widowson, Sask., I give this plan of harnessing mine horses. It is used in nearly all the hard-coal mines and is simply made. It is handier than

the foot with a bar shoe, having a toc-plate or a piece of sheet metal affixed to the toc. If the foot is sore or feverish poultice it before shoeing. After the fever or soreness has disappeared a mild blister may be applied twice a month to stimulate the growth of healthy horn. Should the new horn at any time separate from the foot cut it back until it grows down solidly. It may take a year or more to grow a healthy

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covering of horn, but when grown, if carefully watched, it will result in a good and sound hoof. W. O. Julius, New York.

We Don't Always Know .- I am no scribe, but I would like to say a little about THE AMERICAN BLACKSMITH. It is some years since I first saw THE AMERICAN BLACKSMITH, and then I did not think it would be in print long. The man who could shoe a horse or weld a link couldn't write for a The man who could write, could not shoe, so how was that paper to be kept going? Now I would like to thank the man who had sand enough to start such a paper. It takes sand to tell some blacksmiths that there is something they don't know. Then I would thank all the writers who have done so much for their brothers. I feel very proud to know we have such good and clever men. I say good, because we find men who, though they know things, would not help their brother by letting him know. After reading some brother's writings, I have wished I could grab him by the hand. Of course, some make mistakes: perhaps this is a mistake.

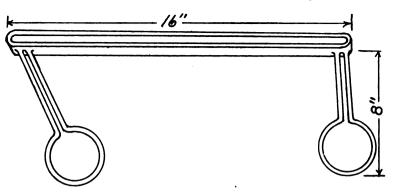
I think brothers, in writing, ought not to swagger; that is, they ought not to tell what they have done or can do without letting us know how to do it. When I look at THE AMERICAN BLACKSMITH and see the good covers on it and the good clean print and plates I feel that I am not buying something cheap and no good, but some-

thing to be proud of.

Kickers, well, I have them around myself and I don't deal with half the people THE AMERICAN BLACKSMITH does. about learning the trade. Well, I was considered good and smart when I was only at the trade a year or two. Yet, it come to me one day after working seven years that I was just learning how to calk a shoe. I don't mean to discourage anyone, but I think blacksmiths could show an apprentice more than they do sometimes; but the apprentice must think for himself, too.

The advertising part of "Our Paper" is O. K., and is as interesting as the other part. I think it helps dealer and black-J. W. smith.

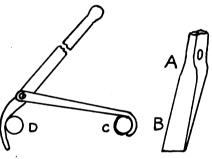
To Hold Shares-Iowa Prices.-The accompanying engraving shows a device for



A SIMPLE TOOL FOR HOLDING SHARES

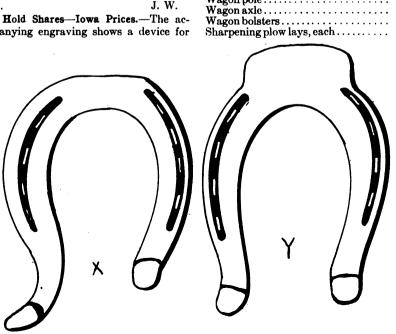
holding slip shares under the trip hammer. If Mr. Henke will try this he will have no. trouble holding shares under a trip hammer, and the lay cannot possibly warp. I always use this device on all shares and like it better than tongs, as it never gets loose and cannot come off. The stock used is one by three eighths inch with a 7-inch slot to bolt through. The handle is 1-inch round iron, welded securely to

The following are a few of the prices I get: Rubber pads, per pair \$1.50



FOR RIMMING WHERLS

Four new shoes	\$1.60
Four old shoes	.80
Setting buggy and wagon tires, each	.50
Buggy and wagon spokes, each	.25
Felloes, each	.25
Wagon pole	2.75
Wagon axle	3.00
Wagon bolsters	1.50
Sharpening plow lays, each	.35



SPECIAL SHOES FOR SPECIAL CASES

Sharpening discs up to 18-inch..... \$3.00 Sharpening and polishing surface 1.00 knives knives.....
Pointing shovels, each..... .50 JESSE BALL, Iowa.

SEVERAL REPIES TO QUERIES.

A Horse that Interferes and Crossfires. In reply to Mr. G. Morris, of Georgia. He wants a shoe for a horse that interferes and crossfires. I will call his attention to the shoe at X. If he wants to know how to attach it, I should say simply dress the foot perfectly level and nail it on the same as any shoe, having a heavy side weight and the long drag heel. If the first shoe doesn't stop it, apply a little more side weight and lengthen the calk on the drag. Make it a half inch longer than the inner calk and sharper. This shoe will make a horse travel wider and when he travels wider he cannot interfere nor crossfire.

For the Toe Walker.-Mr. Widowson, of Sask, wants a shoe for a mule that walks on his toe. I will refer him to the shoe at Y. Take a common shoe and put on an extension toe so that it will project out in front about one inch and put on fair size heel calks and make them half sharp. Now, it will depend on how long his mule has been walking on his toe. If the flexor tendons have been inflamed and diseased and become abnormal, which they undoubtedly have, I do not know if after a period of time a shoe will do any good, but this will do the work if there is any show at ail. One thing is sure; it won't break him up to try it, and if it proves good so much the better.

A Device for the Wheelwright .- In reply to Mr. D. W. Clark, of New Mexico, for a device for putting on rims, I will give one of mine. I have a number of different kinds, but this is simple and easily made. Take a piece of five sixteenths by one by sixteen inches long and flatten the end for about five or six inches as shown at A. Punch a 3-inch hole six inches from the end and give this end a slight hook curve. For the other piece, take a piece of the same stock about fourteen inches long, scarf one end and double it over about four inches and weld. Then cut into the end and punch a 3-inch hole in it and spread the split so as to straddle the main lever. Now change ends and draw down from weld to point. Make the point about one inch wide and bend a hook on end; bolt together and your tool is ready to operate. By placing the hook over a spoke and the short end of the main lever back of the next one as shown in the engraving and with the hand on the top of the lever you can pull them into place very easily. You will need two different sizes. C. W. METCALF, Iowa.

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from the factory direct to

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This is the only place in the world where you can buy your entire supply of vehicle parts and have them shipped together. We make all the parts for our own vehicles and constantly carry them in large quantities. This means that you are quickly supplied with the pieces you want, saving the usual jobber's profits and double freight rates.

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Extra order blanks on request.

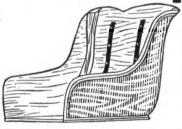
Seats, Bodies, Tops, Gears, Wheels, Shafts, Poles, Etc.

Orders carefully filled and promptly shipped.

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INDIANAPOLIS, IND.

"We make the Price."



Quick-Wear-Out Tires Do Not Pay

Putting tires made of worn-out rubber on vehicles doesn't help the buyer and doesn't help the seller. Goodyear Wing Tires are just as good as pure new rubber, and the Goodyear "Wing" construction can make them



WING CARRIAGE TIRES

are made of the highest grade gum, fresh from the rubber trees—lively and durable. It is quoted on the market at \$1.30 per pound today. We could buy "Lapori" or "Guayule" rubber at 35 cents a pound, or even old reclaimed rubber at 10 cents per pound, but it won't do for a Goodyear. Notice the Goodyear Wings. They keep out all dust, grit, mud and water, which gets in under the ordinary solid tire and wears it away. Write today for booklet showing how Goodyear's are built. Ask for sample section.

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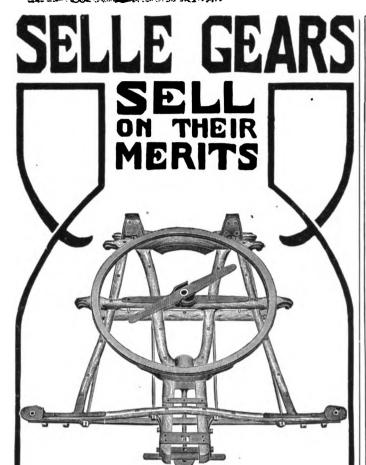


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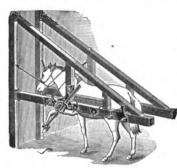
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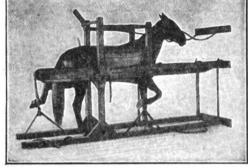


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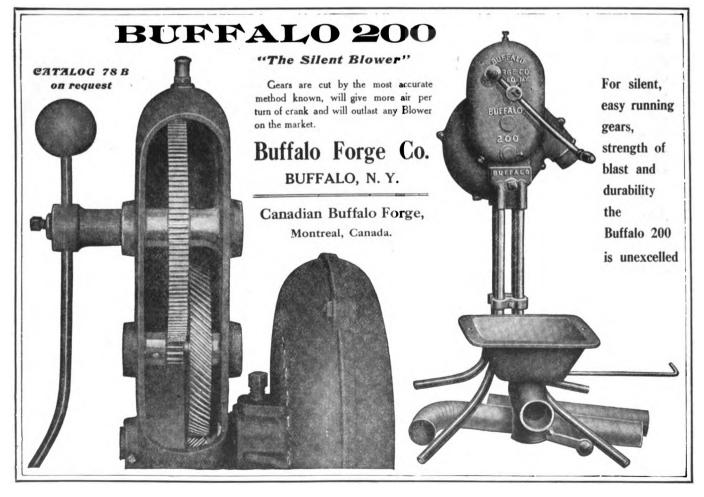
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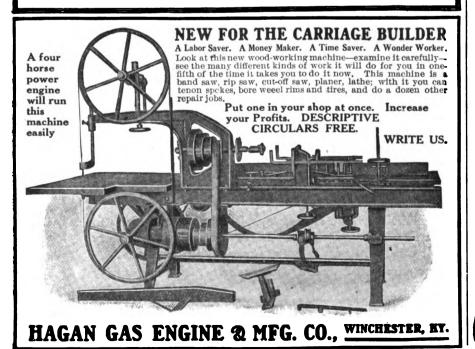
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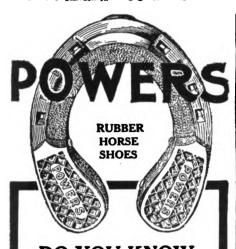
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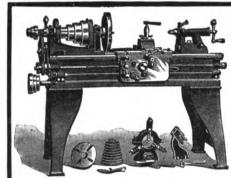
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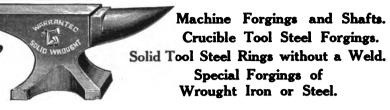


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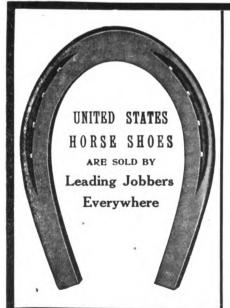


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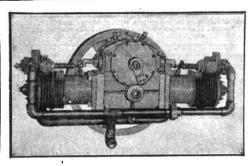
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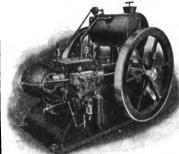
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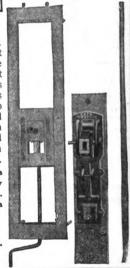
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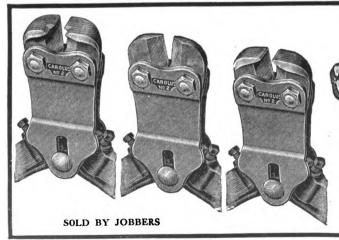
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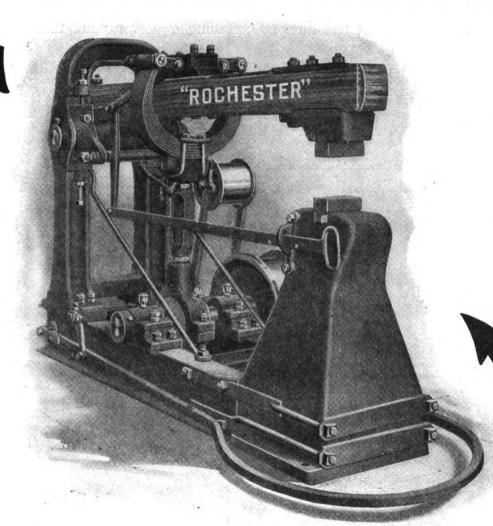
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Vertical engines made in 2, 3 and 25-horse-power.

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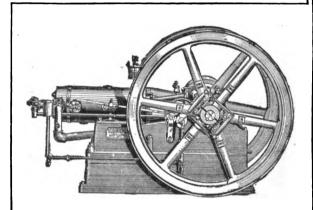
Air Cooled engines in 1 and 2-horse-power.

Call on International local agent for catalog and particulars or write the home office.

International Harvester Company of America

13 Harvester Building,

CHICAGO, U.S. A.





Hundreds in use by the U. S. Government, Contractors, M a n u facturers,* Mechanical Schools, etc.

It is the BEST tool for the Blacksmith Shop for which it was especially designed. Made in three sizes.

Prompt Shipment Guaranteed



Send for Circular

Sold by all Jobbers

Little Giant Punch & Shear Co., Sparta, Ill.





REMY MAGNETOS

Will start and run your Gas or Gasoline Engine without the aid of batteries. Inexpensive and absolutely reliable for either make and break or jump spark ignition. Information sent on request.

REMY ELECTRIC CO., Anderson, Ind.

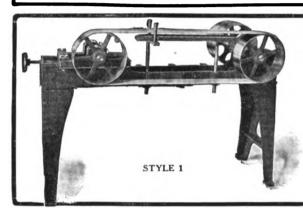


Try Borax-ette for Welding Toe-Calks THEY WON'T KNOCK OFF

It makes steel weld like iron. It has no equal for welding tires, axles and springs

FOR SALE BY ALL DEALERS
SAMPLES FREE

CORTLAND WELDING COMPOUND CO., Cortland, N. Y.

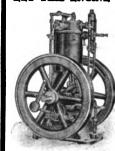


BICKNELL'S BELT SANDER

is making money for others, why not for you? Ask your jobber about it. Write for catalogue of Labor-Saving Machinery.

Bicknell Mfg. & Supply Co. JANESVILLE, WIS.

LET THIS ENGINE RUN YOUR SHOP

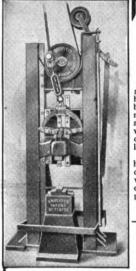


Only One Cent an hour per H. P.

No trouble. You start it in the morning and the will run till night without any attention whatever. You can stop and start at will. No delay. Power always ready, Drop us a line and let us explain this wonderful gasoline engine.

Strelinger Marine Engine Co.

Dept. A. B.
46 Congress Street E.
DETROIT, MICH.



GRIFFITTS BELT POWER HAMMER

MADE OF STEEL Every Part Riveted

It is the strongest and most durable hammer made. The best all-around hammer for blacksmith and wagon shops. It will not get out of order; will not work loose.

This machine will help you do better, quicker and cheaper work. Get our full description and prices.

WRITE TODAY

GRIFFITTS MACHINE WORKS.

SAN FRANCISCO, CAL.

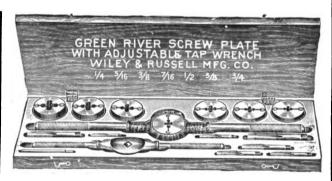
GREEN RIVER SCREW PLATES, with Adjustable "Drop Forged Steel" Tap Wrenches



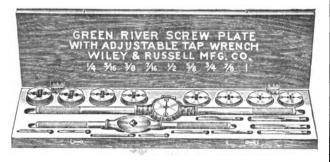
No. 1102. A to ½ inch. Stock 18 in. long. 6 sizes, 7:24, ½-20, ½-1×, ½-14, ½-12, Taps, Dies and Guides, and Adjustable Tap Wrench, No. 52.



No. 1124. ¼ to ¾ inch. Stock 22 in. long. 5 sizes, ¼-20, ¾-16, ½-12, %-11, ¾-10, Taps, Dies and Guides, and Adjustable Tap Wrench, No. 58.

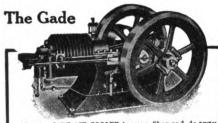


No. 1104. ½ to ¾ inch. Stock 22 in long. 7 sizes. ½-20, ½-18, ¾-18, ¾-16, ¼-14. ½-12. ‰-11, ¾-10, Taps, Dies and Guides, and Adjustable Tap Wrench, No. 63.



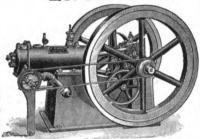
No. 1112. $\frac{1}{4}$ to 1 inch. Stock 29 inches long. 9 sizes, $\frac{1}{4}$ -20, $\frac{1}{48}$ -18, $\frac{3}{8}$ -16, $\frac{7}{48}$ -14, $\frac{1}{4}$ -12, $\frac{5}{8}$ -11, $\frac{3}{4}$ -10, $\frac{7}{8}$ -9, 1 in.-8, Taps, Pies and Guides, and Adjustable Tap Wrench, No. 54.

Send for Catalog 34-D and prices. Sole Makers, WILEY & RUSSELL MFG. CO., Greenfield, Mass., U.S.A.



Put the GADE AIR COOLER in your Shop and do away with a big water tank, pipes, etc., and the risk of a "freeze up." We claim to use one-tind less gasoline than any other make. Sizes 2, 3, 6, and 12 H.P., all air-cooled. Guaranteed rated horsepower. This is the engine that "BREATHES." Don't monkey with a FAN, but investigate our air-cooling apparatus. Low price to Blacksmiths. Send for catalog. Address GADE BROS. MFG, CO., North High, Iowa Falls, Iowa.

-HAGAN ENGINES



(2-28 H. P.)

ECONOMICAL and RELIABLE POWER FOR THE SHOP-RUNNING BLACKSMITH and WAGON MAKER.

HAGAN ENGINES are recommended on account of their simplicity, durability, comparatively low price, small cost of operating and the ease and certainty with which they can be controlled.

Our Catalog explains all working parts. A postal will bring a copy to you. It's free, Write today.

= HAGAN = GAS ENGINE AND MFG. CO.

Winchester, Ky., U. S. A.

THE PERFECT **POWER** HAMMER

The Only Hammer Made with extra long guides, insuring a direct vertical stroke of the ram.

The Only Hammer Made with a disk attachment with a special anvil for sharpening plow and harrow disks.

Made in three sizes :

2½ in. Sq. Ram, Wt. 30 lbs. 80 ..

Prices are right. Write any jobber or

MACGOWAN & FINIGAN FOUNDRY AND MACHINE CO. ST. LOUIS, MO.



AJAX GAS AND GASOLINE THE 4 Cycle 5 to 10 H. P. ENGINES

For the small power user there are no better engines made. Their construction combines strength, simplicity and economy. Backed by the most accurate workmanship, made of the highest grade of material, every part interchangeable, our engines give years of satisfactory service. Learn more about them. Our big illustrated catalog mailed free on request,

CORRY, WORKS.



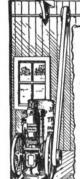
YOU'RE TIRED AND WORN OUT

From using that old-style Hand Blower. Get a Modern Electric

ROTH FORGE BLOWER AND ENJOY LIFE

Write for interesting prices and bulletin No. 1611

ROTH BROS., 27 So. Clinton St., CHICAGO, ILL. NEW YORK OFFICE: 136 Liberty Street.



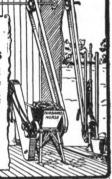
FAIRBANKS-MORSE

Jack of All Trades Gasoline Engines

are the most economical and reliable for all power purposes. BE AN AGENT and have one in your shop where your customers can see it operate your machinery. Saves half your time and makes selling EASY.

Ask for new agency proposition No. 487 A. P.

FAIRBANKS, MORSE & CO. CHICAGO, ILL.



THE ACME DRY BATTERY No. 16 werful Dry Bal on Earth. he Nungesser Electric Battery Co.

ACME Dry Batteries for Ignition

THE MOST IIMPORTANT THING NEXT TO GETTING GAS IN YOUR CYLINDERS IS EXPLODING IT

The fuller and hotter the spark, the better and stronger the explosion, and the greater the efficiency of your engine. If you use ACME DRY BATTERIES you can always depend upon a hot, fat spark, strong, full explosions, and the maximum of efficiency from your engine.

The Nungesser Electric Battery Co. CLEVELAND, OHIO.

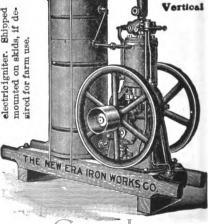
General Sales Office, 128 West Jackson Boulevard, CHICAGO



P. Vertical, Horizontal. es, 1½, 8, 4½ H. P. Veri 5 to 25 H. P. Horizo Edither tube ignifica-electricigniter. Bhi mounted on skids, ii on sh

Also equipped with pumping attachments. Write for booklet describing full line New Era Gas Engines from 4 to 100 H. P. Special inducements to dealers

THE NEW ERA GAS ENGINE CO. No. 63 Dale Ave., DAYTON, OHIO.



3 H. P.



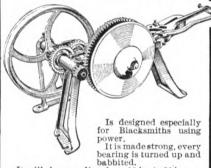
EVERYTHING NEEDED FOR IGNITION The Dayton Electrical Mfg. Co.

152 St. Clair St. - OHIO. DAYTON,









Dabbited.

It will sharpen discs from 10 in. to 36 in.

Large plow discs are its specialty.

Write for prices to

WALKER MFG. CO.. COUNCIL BLUFFS, IOWA.



Over 2,000 Now Sold

The Best Power Hammer on the market. Works material up to 5 in. round.

FULLY GUARANTEED

MAYER BROTHERS, Inc., MANKATO, MINN.

United States, New Zealand Agents, All Jobbers, Alex. Storrie, Ltd., Invercargill. Manitoba, Saskatchewan and Alberta, Melotte Cream Separator Co., Winnipeg.

JUNIOR GASOLINE ENGINES

have all the advantages of a plant and equipment which has been brought to a high standard of perfection by twenty-two years of ex-clusive gas engine manufacture.

The simplicity of design, which characterizes the regular FOOS, is

The simplicity of design, which characterizes the regular present in the FOOS JR.
Send for Catalogue No. 49, which gives details, and tells in an argumentative way about many superior gas engine points. 2 and 5 H. P.
THE FOOS GAS ENGINE CO., Springfield, Ohio

Trade Literature and Notes.

A NEW BOOKLET has recently been received from the Silver Manufacturing Company, which appears to be a very worthy addition to their other attractive booklets. It is called "Drilling Machines" and fully describes and illustrates their line of hand and power drills. Our readers, who are not already familiar with the complete line of tools manufactured by this company, will do well to send for the new Drilling Machine booklet and the others that are desired. These will be found mentioned in their advertisement on the inside front cover page.

ACCIDENTS ARE ALWAYS LIABLE TO HAPPEN, and it is good to have handy a liniment to cure Bruises, Strains and Soreness. Absorbine is well-known to our readers as a reliable remedy to stop pains, remove Inflammation or Burns, heal a Wire Cut, Wound or Scar Tissue and heal with hair on and leave no blemish. Absorbine is an antiseptic preparation, as well as a resolvent and discutient. It will assist in bringing about a dissolution of the bunch, filling in the underlying tissues, and restore the circulation to a normal condition. Your druggist may have it or it will be sent to you post paid. See the advertisement elsewhere in this issue for prices, etc. It is manufactured only by W. F. Young, P. D. F., 230 Temple Street, Springfield, Mass.

NEARLY EVERY BLACKSMITH AND SHOER is so situated that a good horse-clipping machine may be a means of bringing him plenty of work at spare times and prove an excellent source of profits. This work can be undertaken at but a small outlay, which is simply the price of a clipping machine. And in this the purchaser has a wide range of choice. A most complete line of clipping machines is offered our readers by the Chicago Flexible Shaft Company. Among their many varieties of horse-clipping machines may be found one that will fit every need and every pocketbook. Their line contains both hand-operating machines at attractive prices, and also electric-driven machines where electric power is obtainable. All of their clipping machines are built on the latest and most substantial principles with a view to least loss of power through friction and the greatest durability. Because of their unusually large output, the manufacturers state that they are able to sell at prices beyond competition and yet maintain the highest quality in material and workmanship. It will pay our readers who do not now have a clipping machine to write the Chicago Flexible Shaft Company for their full descriptions and prices. Address 186 Ontario Street, Chicago, It may put you in the way of some pleasant and profitable business.

A RECENT ADDITION to the many time and labor-saving devices for the smith and vehicle repair man is the Common Sense Tire Remover. It is a most efficient machine for removing tires from the wheel and can be operated by one man no matter how large the wheel. The manufacturers say that it will remove any tire without injury to the wheel in any way, and that it does its work quicker than it can be done by any other method. It takes but little space, and can be placed anywhere on a floor and when not in use can be closed up against the wall. This useful device is being advertised elsewhere in this issue. also illustrations of it are shown. It is for sale by dealers or may be had from the manufacturers direct. Address Common Sense Tire Remover Company, Dowagiac, Mich.

Company, Dowagiac, Mich.

WITH DEEP REGRET The Timken Roller Bearing Axle Company, Canton, Ohio, announces the death of its President, Mr. Henry Timken, which occurred at San Diego, Cal., on the 16th of March. His death was a surprise, despite his 76 years, for he was unusually sturdy and rugged, and his illness lasted but a few days. For twelve years Mr. Timken has lived in San Diego, Cal., and was buried there on Sunday, Ma ch 21st. On Saturday, the 20th, the factory in Canton was shut down in tribute to his memory.

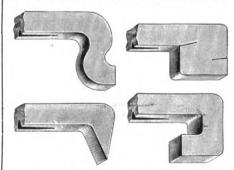
The pioneer in the manufacture of Carriage, Mr. Timken began his business career, which has been so long and so successful, in St. Louis, Mo., when the city had but 25,000 inhabitants. His first patent, which he manufactured and put upon the market, was the Timken Spring. This was followed by his own invention of the Tapered Roller Bearing that bears his name. And it is these two devices which have made him known throughout the length and breadth of the land. After a successful career in the Carriage and Wagon world of more than 45 years Mr. Timken retired from active business and went to live in San Diego, Cal.

THE SIDNEY TOOL COMPANY, of Sidney, Ohio, have recently brought out a new attachment to be used on their Famous Universal Wood Worker, consisting of their Power Feed Planing



Attachment, as shown in the accompanying cut. This planing attachment will plane from one sixteenth inch up to four inches thick, and the full cutting width of the knife. It will size timber to an even thickness, and works on the same principle as a regular pony planer. With this attachment you can also apply a sand drum to the Universal Wood Worker and in this way arrange your machine for a power feed sander. They also furnish guides with this attachment with different stops for making moldings any width and can also make a planer, molder and matcher out of the Universal Wood Worker with this attachment. The machine is especially adapted for the blacksmith and wagon maker's trade. It can also be furnished with a complete felloe, tongue and shaft rounder which is often desirable. The Sidney Tool Company have many other attachments which they will gladly explain to you if you will write for their catalogue "B." Their advertisement appears in this journal, on page 4, showing the machine as a band saw with jointer and saw-table attachments. This is one of the most up-to-date and latest improved wachines on the market, and it will pay you to write them for full description if interested.

A NEW MACHINE that is creating a very wide interest in the shoeing trade is The American Calking Machine, which is being manufactured by the American Calking Machine Company, at Perry, Iowa. This machine is a most ingenious device for turning calks on horseshoes. The variety of shapes it will turn is remarkable and



some of them are illustrated herewith. Besides turning calks on horseshoes the machine is also very useful for general bending work and will turn up at right angles three inches of the hot end of a bar of iron as fast as it can be put in the machine. It will also cut medium-sized bars of iron any desired length by heating the iron where it is to be cut. The machine is small, compact and strongly built. The manufacturers say that it has been perfected only after three years of careful study and experiment by a practical horseshoer. It is built mostly of malleable iron and steel, and as it stands less than three feet high takes up little room. It weighs about one hundred pounds and can be carried or moved without trouble. The manufacturers are making a special offer on this machine for a short time to introduce it to the trade and it will pay you to investigate their proposition. For further information refer to their advertisement elsewhere in this issue, and address their general sales department! Free Nytional Bank Building, Chicago.

Two Inch Sawed Hounds

Hind..... Wheels

Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, March 15, 1909, and are subject to fluctuations. Corrected for The American Blacksmith by The National Heavy Hardware Reporter Chicago.

Correspondents report no changes in prices on wood stock items, but prices are much firmer now than several months ago. It is the general opinion that wood stock and hardwood of all kinds will be

that wood speck and mardwood of all kinds will be considerably higher as the year gets older.

The recent reduction in steel has caused some disturbance and also considerable uncertainty as to the future. Trade conditions are reported fair, though some say that business is hardly up to expectations as yet.

Horse Shoes-	
All Iron Shoes	\$4 .40
Steel Shoes	4.25
No. 0 and No. 1 25c. extra. 15c. per keg	
additional charged for packing more	
than one size in a keg	
Mule Shoes	4.90
Featherweight Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Ideal Countersunk	6.00
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
	9.50
Track Weight.	5.50
E. E. Light Steel	5.50
Steel Driving	
O. O. Mule Shoes, extra	1.50
Merchant Bar Iron—	
\$1.70 to \$1.90 rates full extras, and 20 ce	nts per
100 pounds extra for broken bundles.	

Steel	Ba	rs-	-			
\$1.	.60	to	\$1.80	rates,	full	extras.

\$1.60 to \$1.80 rates, full extras.	•
Toe Calks— Blunt	Per box. \$1.30 1.55
Carriage Bolts— 6 x å and smaller Larger and longer	.60-10% 50%
Machine Bolts— 4 x f and smaller Larger and longer	.60-10% 50%

4 x g and smaller Larger and longer	 	:	50%
Nuts— Less than 10 lbs, of a size From 10 to 50 lbs	 		 \$2.50 off 3.00 off

Washers— Same price as nuts.	Skeins— Cast6	50%
Maileables— Common \$.09	Haif Patent Axles —	5%
Springs— Single Spring, each Springs, black and half	\$.25 .06
Hickory Lumber—Per Fo	ot— \$	0 9 1
Ash and Oak Lumber—Po	er Foot— 21-3 \$ 31-4	.08 .09

Yellow Poplar Lumber	-Per M.	Feet-	
	6 to 12	13 to 17	18 to 24
3"	£65.00	\$65.00	\$75.00
i"	65.00	68.00	80.00
1	68.00	75.00	85.00
[7]	72 00	80.00	104.00
Rough Hickory Axles-		*	Each.
3 x 4 6 ft	. 		. \$.60
21 - 41 6 6			1 00

Rough Hickory Axles—	Each.
3 x 4 6 ft	\$.60
34 x 44 6 ft	
4 x 5 6 ft	
5 x 6 6 ft	2.20
4 x 5 6½ ft	1.30
41 x 51 61 and 7 ft	
5 x 6 6 and 7 ft	
√5½ x 6½ 7 ft	3.50
Finished Hickory Axles— For 2½ and 2½ Skeins. For 3 Skeins For 3½ Skeins For 3½ Skeins For 3½ Skeins For 4 Skeins	1.20 1.45 1.60 1.95
Rough Oak Bolsters— Short	
Finished Oak Bolsters—	\$.65

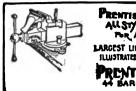
Rough Oak Wagon Tongues— 4 x 4 x 2 x 4 x 12 and smaller

Finished Oak Wagon Tongues—
31 and smaller
32 4

C. No. 13 and under	35-5 %
Cupped Oak Hubs—Set. Plain E 7 x 8 x 9 \$1.10 10 x	nd Oak Hubs-Set.
7 x 8 x 9 \$1.10 10 x 7 x 9 x 10 1.10 11 x	nd Oak Hubs-Set, 14 \$2,90 14 3.60 15 4.00 16 4.50 16 5.00 17 5.50 18 6.25
8 x 9 x 10 1.35 11 x 8 x 10 x 11 1.50 11 x	16 4.50
9 x 10 x 12 1.70 12 x 1	16 5.00 17 5.50
10 x 12 x 13 2.60 13 x	8 6.25
12 x 14 x 15 4.50	
Rough Sawed Felloes-	. 01# 0.00
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	x 2½" 2.00 x 2 " 4.75 x 3 " 5.75
1) x 2 " . \$1.55, 2 1) x 2 " . 1.75 2½ 1) x 2 " . 1.85 3 3 x 3½" . 6.0	x 3 7 5.75
13 x 21 1.55 3 3 x 3½" 6.0 Ironed Poles. White, XXX— 13 x 2½" No. 2	•
11 x 21" No. 2	\$4.00
Ironed Shafts, White, XXX— 1 " x 2 " and smaller	
1 7 x 2 " and smaller	\$2.15 2.35
1 2 x 2 1	2.90
Farm Wagon Bows— Round Top, x 2 " Flat Top, x 2 " Round Top, x 2 "	\$.65
Flat Top, x 2 "	1.80
Standard size Piano Bodies with S	1.40
Each	
Plow Beams— 1 Horse	\$.70
2 Horse	
3 Horse	
All Hickory and Oak Spokes and Discount from Weis & Lesh Li	st No. 5. 5%
Wagon Neck Yokes-	
Mixed Forest Second Growt	White h Second Growth
Forest Second Growt 2½ x 38" . \$2.15 \$2.95 2½ x 42" . 2.90 4.05 2½ x 46" . 4.40	\$4.25 5.50
2 x 42" . 2.90 4.05 2 x 46" . 4.40	
3 x 44" . 4.70 6.95 3 x 48" . 5.50 7.85	8.90 10.50
Single Trees—Oval—	
Mixed Forest Second Growt	White h Second Growth
217 \$1.60 \$2.90	\$3.50 3.60
21" 1.80 3.05 3 x 36" 2.45 3.55 3 x 38" 2.50 3 x 40" 2.65 4.00	3.80
3 x 38" . 2.50	4.20
	4.85
Single Trees—Round— Fore	t Second Growth
Single Trees—Round— Fore 21"	A #9 4A
Single Trees—Round— Fore \$2.1" 2\" \$2.1 2\" 2.1 2\" 2.1 2\" 2.2 2\" 2.5 2\" 2.5	A #9 4A
21" \$2.1 21" 21" 2.1 22" 2.1 23" 2.8	0 \$3.60 0 3.65 5 3.75 5 4.25 5 4.80
	0 \$3.60 0 3.65 5 3.75 5 4.25 5 4.80
	0 \$3.60 0 3.65 5 3.75 5 4.25 5 4.80
Oval Plow Doubletrees— Flat Pl 23 x 36" \$1.75 11 x 3 x 40" 2.55	0 \$3.60 3.65 5 3.75 5 4.25 5 4.80 ow Doubletrees— 3½ x 42" \$3.00
Oval Plow Doubletrees— Flat Pl 23 x 36" \$1.75 11 x 3 x 40" 2.55	0 \$3.60 3.65 5 3.75 5 4.25 5 4.80 ow Doubletrees— 3½ x 42" \$3.00
Oval Plow Doubletrees— Flat Pl 23 x 36" \$1.75 11 x 3 x 40" 2.55	0 \$3.60 3.65 5 3.75 5 4.25 5 4.80 ow Doubletrees— 3½ x 42" \$3.00
Oval Plow Doubletrees— Flat Pl 23 x 36" \$1.75 11 x 3 x 40" 2.55	0 \$3.60 3.65 5 3.75 5 4.25 5 4.80 ow Doubletrees— 3½ x 42" \$3.00
Oval Plow Doubletrees— Flat Pl 23 x 36" \$1.75 11 x 3 x 40" 2.55	0 \$3.60 3.65 5 3.75 5 4.25 5 4.80 ow Doubletrees— 3½ x 42" \$3.00
Oval Plow Doubletrees— 2½ x 36" \$1.75 3 x 40" 2.55 Wagon Doubletrees— 2 x 4 x 48" 2½ x 48" 2½ x 48" 2½ x 4½ x 50" 2½ x ½ x 5 x 52" 2½ x 5 x 54" Mixed Second Growth	0 \$3.60 3.65 5 3.75 5 4.25 5 4.80 ow Doubletrees— 3½ x 42" \$3.00
Oval Plow Doubletrees— 2½ x 36" \$1.75 3 x 40" 2.55 Wagon Doubletrees— 2 x 4 x 48" 2½ x 4½ x 50" 2½ x 4½ x 52" 2½ x 4½ x 52" 2½ x 5 x 52" Mixed Second Growth White Second Growth Oval Plow Singletrees—	0 \$3.60 0 3.65 5 3.75 5 4.25 5 4.80 low Doubletrees— 3½ x 42" \$3.00
Oval Plow Doubletrees— 2 \(\times \text{36''} \) \$1.75 3 \(\times \text{40''} \) 2.55 Wagon Doubletrees— 2 \(\times \text{4} \times \text{50''} \) 21 \(\times \text{48''} \) 50'' 21 \(\times \text{41} \times \text{50''} \) 22 \(\times \text{42} \times \text{52''} \) 21 \(\times \text{52} \times \text{52''} \) 21 \(\times \text{5} \times \text{52''} \) 22 \(\times \text{5} \times \text{52''} \) 21 \(\times \text{5} \times \text{52''} \) 21 \(\times \text{5} \times \text{52''} \) 22 \(\times \text{5} \times \text{52''} \) 23 \(\times \text{54''} \) Mixed Second Growth White Second Growth Oval Plow Singletrees— 21 \(\times \text{30''} \) and under.	0 \$3.60 0 3.65 5 3.75 5 4.25 5 4.80 ow Doubletrees— 3½ x 42" \$3.00 \$3.60 4.80 5.20 5.20 5.20 5.20 5.20 7.20 5.00 advance Forest
Oval Plow Doubletrees— 2½ x 36" \$1.75 3 x 40" 2.55 Wagon Doubletrees— 2 x 4 x 48" 2½ x 4½ x 50" 2½ x 4½ x 52" 2½ x 5 x 52" 2½ x 5 x 54" Mixed Second Growth White Second Growth Oval Plow Singletrees— 2½ x 30" and under	0 \$3.60 0 3.65 5 3.75 5 4.25 5 4.80 ow Doubletrees— 3½ x 42" \$3.00 \$3.60 \$4.80 5.20 5.20 5.20 5.20 5.00 6.40 7.20 5.00 advance Forest
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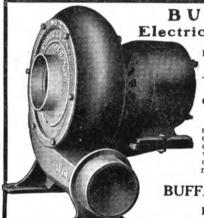
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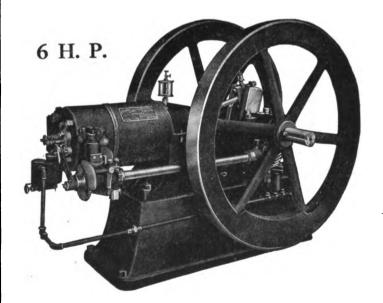
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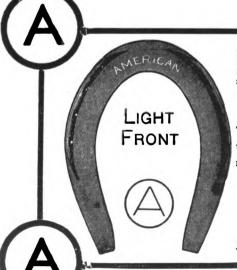
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American School of Correspondence. International Correspondence School.

Screw Plates. rew Plates.
A. J. Smart Mfg. Co.
Butterfield & Co
Hart Mfg. Co.
E. F. Reece Co.
Wells Bros. Co.
Wiley & Russell Mfg. Co.

Shafts.

Parry Mfg. Co. Pioneer Pole and Shaft Co. Warner Pole & Top Co.

Shaft Couplings. C. C. Bradley & Son. Richard Eccles Co.

Shears. Bertsch & Co. Bicknell Mfg. & Supply Co. Buffalo Forge Co. Little Giant Punch & Shear Co.

Spoke Puller.
Spoke Puller Mfg. Co.

Springs.
E. B. Adams & Son.
Harvey Spring Co.
Raymond Mfg, Co.

Steel Stamps. Geo. M. Ness, Jr.

Steel

Bourne Fuller Co. Firth Sterling Steel Co.

Steel Shapes. Crescent Forge & Shovel Co. Star Mfg. Co.

Stocks & Dies DUES. & DIES.
Butterfield & Co.
Canedy-Otto Mfg. Co.
Hart Mfg. Co.
E. F. Reece Co.
A. J. Smart Mfg. Co.
Wells Bros. Co.
Wiley & Russell. Tenoning & Boring Machines.

cnines.

Hagan Gas Engine & Mfg. Co.
Silver Mfg. Co.
Sidney Tool Co.
Vulcan Iron Works.
Bicknell Mfg. & Supply Co.

Tires, Rubber.

Goodyear Tire & Morgan & Wright. & Rubber Co.

Tire Bending Machines. National Tubular Axle Co.

Tire Heaters. Rochester Tire Heater Co.

Tire Removers. Common Sense Tire Remover Co.

Tire Setters.

Brooks Tire Machine Co.
House Cold Tire Setter Co.
Mayers Tire Setter Co.
Rochester Tire Heater Co.
National Hydraulic Tire
Setter Co.

Tire Shrinkers, Buffalo Forge Co.

Tops & Trimmings. Buob & Scheu. Indiana Top & Vehicle Co. Parry Míg. Co. Warner Pole and Top Co.

Transfer Signs.
Palm Fechteler Co.

Twist Drills.

Cleveland Twist Drill Co Detroit Twist Drill Co. Morse Twist Drill & Machine Co.

Vehicles.

Buob & Scheu. Parry Mfg. Co.

Veterinary Remedies.

G. C. Hanford Mfg. Co. Newton Horse Remedy Co. O. K. Stock Food Co. W. F. Young.

Vises.

Eagle Anvil Works. Chas. Parker Co. Prentiss Vise Co.

Wagon Standards. A. H. Harshbarger. National Wagon Standard Co.

Welding Compound.
Cortland Welding Compound Co.,
Phillips-Laffitte Co.

Welding Plates. Phillips-Laffitte Co.

Wheels.

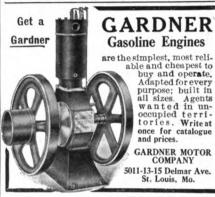
Boob Wheel Co. Parry Mfg. Co.

Wheels, Metal.

Wheels, Metal.
Electric Wheel Co.
Empire Mig. Co.

Wood Working Machinery.
Bicknell Mig. & Supply Co.
Crescent Machine Co.
Defiance Machine Works.
Hagan Gas Engine & Mig. Co.
Sidney Tool Co.
Silver Mig. Co.





DO NOT ACCEPT **IMITATIONS**

When you ask for an article you have seen advertised in The American Blacksmith, see that Don't let your you get it. dealer sell you something which he calls "just as good." Don't let a traveling man talk you into buying an inferior make. goods advertised in these columns are made by firms whose reliability we guarantee. You run no risk whatever in buying these goods Refuse imitations.

Insist upon getting what you ask for

ESTABLISHED ANVIL WORKS 1843

200 DIFFERENT WEIGHTS AND SHAPES FROM 10 LBS. TO 800 LBS.



NONE BETTER MADE **OVER 300,000 IN USE**

THE ANVIL OF MANY MEDALS.

The "EAGLE ANVIL" has taken FIRST PRIZE wherever taken FIRST PRIZE wherever exhibited. When a man who KNOWS is ordering he always says: "Nothing but an Eagle for me." Because he knows that the body of the Eagle Anvil is made of unyielding crystalized iron, with hardened steel face, and not of fibrous wrought iron, that is sure to settle in face after a few years' use.

VISES OF MERIT

The "FISHER" Parallel Leg Vise is the only Leg Vise made having jaws that always remain parallel at whatever opening.

It is made heavy enough to withstand all strains and will last a lifetime.

We also make a light, parallel BENCH VISE of superior quality, fitted with plain or swivel base.

Write for our descriptive Anvil and Vise Catalog.
Our goods are handled by reli-

able dealers everywhere.



PARALLEL STRONG AND DURABLE.

FISHER & NORRIS.

33-47 Fair St.,

TRENTON, N. J.

Reece Combination Screw Plate No. 103

\$8.25 NET WILL BUY ONE



The No. 103 Reece Combination Screw Plate

includes one Reece Adjustable Guide Stock, 24 inches long for 2 7-32 inch diameter DIES; Three individual Full Mounted Stocks; Seven Plate Tape and Seven Reece Adjustable Dies, cutting 1-4 — 20, 5-16 — 18, 3-8 — 16, 7-16 — 14, 1-2 — 12, 5-8 — 11, 3-4 — 10. REMEMBER that this is practically a FULL MOUNTED SET. REMEMBER that the Stocks have MOTTLED FINISH; that the DIES are adjustational series of the serie ble, and make perfect threads at one cut; that four persons can use dies from this set at the same time because there are FOUR STOCKS. And LAST, but not LEAST, REMEMBER THE PRICE is only \$8.25 NET, and the Screw Plate guaranteed to give satisfaction or your money will be refunded.

Can You Afford to Neglect This Great Opportunity?

We request you to place your order with your dealer. If for any reason he cannot fill the order (and he can if he wants to), THEN send to us. DO NOT ACCEPT SUBSTITUTES—INSIST on having the REECE COMBINATION SCREW PLATE No. 103.

THE E. F. REECE CO., Greenfield, Mass., U. S. A.

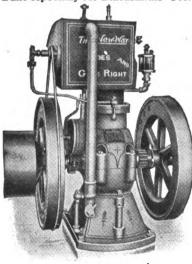
NOTICE TO BLACKSMITHS



IS THE ONLY

GASOLINE ENGINE

Built especially for Blacksmiths' Use. 21/2, 31/2, and 6 H. P.



Look at the other engines first. Note the multitude of rods, springs and triggers described as simple. Remember that the water tank (always left out of the cut) has to be filled and emptied every winter day. To forget it once may mean a ruined engine. Remember that water-cooled engines all have packed cylinder heads. Packing leaks and blows out. Inevitable trouble and loss of power

have packed cylinder heads. Packing leaks and blows out. Inevitable trouble and loss of power sometime.

Then look at an engine that IS simple One-piece cylinder—no chance to leak—grows stronger with use. Everything enclosed—no frail parts—no water—not a piece of packing or a gasket in it—no gasoline pump troubles. It absolutely cannot be overheated under full load—any temperature—sny length of time. Your judgment tells you to length of time. Y judgment tells you to

WRITE FOR CATALOG "K." DO IT NOW.

THE NEW-WAY MOTOR CORPANY Lansing, Michigan, U.S.A. 60 SHERIDAN ST.

Cents a Buys an Oliver

This amazing offer—the New Model Oliver Typewriter No. 5 at 17 cents a day-is open to everybody, everywhere.

It's our new and immensely popular plan of selling Oliver Typewriters on little easy payments. The abandonment of *long* hand in favor of clean, legible, beautiful typewriting is the next

great step in human progress.

Already—in all lines of business and in all professions—the use of pen-and-ink is largely restricted to the writing of signatures.

Business Colleges and High Schools, watchful of the trend of public

sentiment, are training a vast army of young people in the use of Oliver Typewriters. The prompt and generous response of the Oliver Typewriter Company to the world-wide demand for universal typewriting, tremendous gives impetus to the

> movement. The Oliver, with the largest sale of any typewriter in existence, was the logical machine to

take the intiative in bringing about the universal use of typewriters. It always leads!

Save Your Pennies and Own

The___

OLIVER

Typewriter

The Standard Visible Writer

This "17-Cents-a-Day" selling plan makes the Oliver as easy to own as to rent. It places the machine within easy reach of every home—every individual. A man's "cigar money"—a woman's "pin money"—will buy it.

Clerks on small salaries can now afford to own Olivers. By utilizing spare moments for practice they may fit themselves for more

important positions.

School boys and school girls can buy Olivers by saving their pennies. You can buy an Oliver on this plan at the regular catalog price-\$100. A small first payment brings the machine. Then you save 17 cents a day and pay monthly.

And the possession of an Oliver Typewriter enables you to earn money to finish paying for the machine.

Advantages

The Oliver is the most highly perfected typewriter on the market - hence its 100 per cent efficiency.

Among its scores of conveniences are:

- -the Balance Shift
 -the Ruling Device
 -the Double Release
 -the Locomotive Base
 -the Automatic Spacer
 -the Automatic Tabulator
 -the Disappearing Indicator
 -the Adjustable Paper Fingers
 -the Scientific Condensed Keyboard

The Oliver Typewriter turns out more work—of better quality and greater variety—than any other writing machine. Simplicity, strength, ease of operation and visibility are the corner stones of its towering supremacy in

Service Possibilities

- -Correspondence
 -Card Index Work
 -Tabulated Reports
 -Follow-up Systems
 -Manifolding Service
 -Addressing Envelopes
 -Working on Ruled Forms
 -Cutting Mimeograph Stencils

Can you spend 17 Cents a day to better advantage than in the purchase of this wonderful machine?

Write for Special Easy Payment Proposition, or see the nearest Oliver Agent,

The Oliver Typewriter Company

19-21 Swan Street

BUFFALO, NEW YORK





Our Trade Mark Represents the only Tool required to operate the

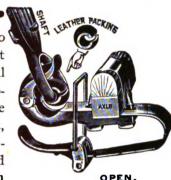
BRADLEY Ball Bearing Shaft Coupling.

A left hand will do as well. We are willing to hold up our right hand and swear that we are the original makers of a Ball Bearing, Leather Packed Shaft Coupling, that Bradley Couplings are Drop Forged from Bar Steel, are Silent, Quick Shifting, Self Lubricating, Automatically take up their own wear and will outwear any vehicle to which

they are attached. There are over a million pairs in use. Quality and advantages considered. they are the cheapest and best couplings on the market.

All We Ask is a Chance to Prove Our Statements

C. C. Bradley & Son, A





The Two Big Sellers For 1909

Demand is unprecedented. Nothing like them on the market for the Money back if not O. K. money.

\$60.00

\$60.00 1909 KERRIHARD

is in a class by itself. **N**ew circulars ready for distribution sent free on request.

The \$21.50 Grinder Combination (Less Wheel and Saw)

fills a long felt want. Look out for the imitation. When you buy one of your jobber get the genuine

"KERRIHARD."

\$21.50

Less Wheel and Saw

Show this advertisement to your jobber; if he is not wise, give him a But chance. then they are all wise.



Hammer and Grinder Dept.

The Kerrihard Company, Red Oak, Iowa.

SHARP DIES

ed in order to cut good threads, and you can always have them if you use a



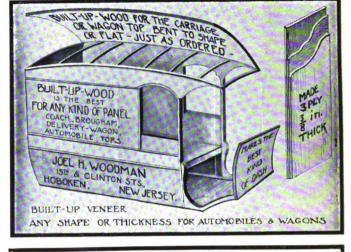
"DUPLEX" DIE STOCK SET

The dies in these sets are easier to sharpen than a knife; this fact enables you to get the full wear out of them. Write us.

THE HART MANUFACTURING CO.,

50 Wood Street,

Cleveland, O., U. S. A.



Progress, Wis., Nov. 5th, 1908.

BUFFALO FORGE COMPANY, Buffalo, N. Y.

Dear Sirs:

I have used two of your No. 200 Buffalo Blowers and think them the best for small shops, as they give a strong blast and run light and are strong and durable. I think they are the best that can be bought for the money.

1. G. Dobbins.



Say! Mr. Blacksmith,

have you heard about the new tire setter called

THE SCIENTIFIC HYDRAULIC?

Blacksmiths are just wild about it where it is used, and the manufacturers are either crazy or dead sure they have a "cinch" on the other fellows for they actually warrant it to be better than any other and will let you be the judge.

GET ONE QUICK IF YOU WANT TO KNOCK OUT YOUR COMPETITORS.

Write for information at once to

National Hydraulic Tire Setter Co.

KEOKUK, IOWA.





replaced.

Have you one in your shop?

If not, don't put it off, for while you delay it could be PAYING FOR ITSELF.

Write today for descriptive matter and terms. Rochester, N.Y. Rochester Tire Heater Co.



Our Taps and Dies are the best that 34 years' experience and up-to-date methods can make them. The easiest cutting and ongest wearing screw cutting tools made. Send for free catalog.

A. J. SMART MFG. CO., Greenfield, Mass.

SOLID HAY - BUDDEN WROUGHT FIRST MADE IN AMERICA

The Gold Medal Anvil HIGHEST AWARD

OMAHA, 1898 PAN-AMERICAN, 1901

Every genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with the best Crucible Cast Steel. Every genuine "Hay-Budden" Auvil is made by the latest improved methods.



ANVILS

Over 150,000 in Use WARRANTED

WEIGHTS FROM 10 to 800 LBS.

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality, Form and Finish to any others on the Market.

BROOKLYN, N.Y. HAY-BUDDEN MFG. CO.,

GENERAL CHARACH THE MAY 17 1909

NUMBER 8

AMERICAN BLACKSMIT

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO N.Y. U.S.A.

MAY, 1909

\$1.00 A YEAR 10c A COPY

The CRENSHAW SPOKE PULLER

The Great Labor-Saving Device for Blacksmiths and Wagon Makers

It is thoroughly practical, extracting spokes from any hub in a few minutes. Does with ease what has heretofore been tiresome, time-consuming and unprofitable work. Powerful and quickly operated. This machine has actually removed all the spokes from a wheel in a minute and a half.

A MONEY MAKER FOR THE SHOP OWNER.



To operate machine open out the levers and place in the spoke puller plates

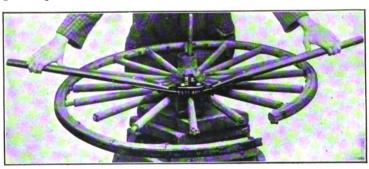
against the hub, draw levers together and the spoke will come right out. The operation is simple but effective.

Made in two sizes. The No. 1 size will extract spokes from a common two-horse wagon to a buggy spoke. The No. 2 size will extract spokes from a two-horse wagon wheel to a log cutter. Attachment for pulling short spokes may also be furnished with the spoke puller on application.

JEFFERSON, GA., Jan. 8th, 1909.

To whom it may concern:

I am highly pleased with the "Crenshaw Spoke Puller," and would not be without it in my shop. I saved enough in five days in my time to pay for the machine. Any man who does any amount of work on wheels should have the "Crenshaw Spoke Puller." Very truly, J. B. BONE.



MACHINE IN OPERATION.

A GRAND MACHINE.

MANSFIELD, GA., Dec. 5,

J. B. ARTHUR, General Manager.

Spôke Puller Mfg. Co. Atlanta, Ga.

Atlanta, Ga.

Dear Sir.—We think the
Crenshaw Spoke Puller
A GRAND MACHINE, and
we would not take many
times its cost if I could not
get another. Any man
that has a blacksmith shop
should have a Spoke Puller. Respectfully,

CURTIS BROS.

SOLD BY LEADING DEALERS EVERYWHERE.

If your dealer cannot supply you write direct to home office. Crenshaw spoke pullers are sold on a guarantee. Price, \$5.00.

SPOKE PULLER MANUFACTURING CO.

J. B. ARTHUR, General Mgr.

ATLANTA, GA. 516 EMPIRE BLDG. : : :

Get Posted Now on Silver's Tools

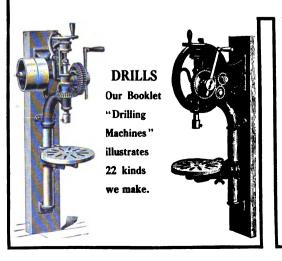
Untie from your hitching post and get into the procession. We have the printed matter of the machine you need in your shop. We will post you up to date if you will give us the chance. If you don't, there's no one to blame but the person you see in the glass.

Write out your request for our new 1909 loose leaf catalog, or for booklet of any tool you're interested in. Your railroad magnate will send a mail train around to deliver your letter to us. You don't need to bother about the delivery—you just send your address today, right now.

The SILVER MFG. co.

365 Broadway

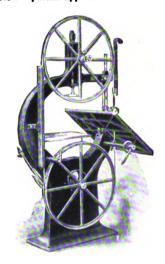
SALEM, OHIO





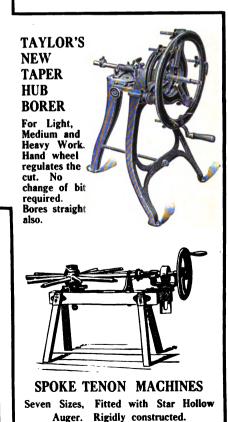


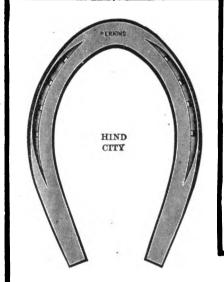
SILVER'S NEW JOINTERS
Five Sizes—8, 12, 16, 20 and 24 inch.
New "patent applied for" features.

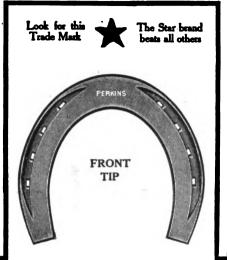


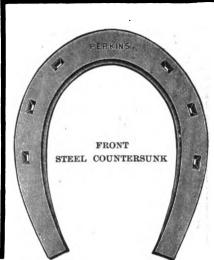
SILVER'S NEW BAND SAWS

Four Sizes—Patented tilting device for table—All parts easily reached by operator—New ratchet foot power device on 20 inch machine.











★PERKINS★ HORSE SHOES TOE CALKS The SUPERIOR Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.

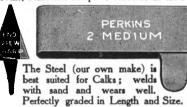


Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send

COMPLETE CATALOG AND SAMPLE FREE

PERKINS

Made in Medium, Long, and Extra Long, both blunt and sharp, also Medium Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.

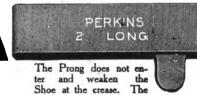


WRITE TODAY.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



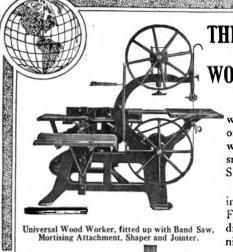


only slightly curved Calk



MANUFACTURED BY-

RHODE ISLAND PERKINS HORSE SHOE COMPANY PROVIDENCE, RHODE ISLAND.



388

THE WORLD'S FAMOUS LINE

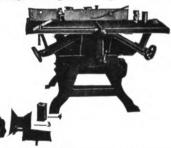
WOOD WORKING MACHINERY

The four cuts illustrated on this page will give you a fair idea of the construction of the FAMOUS Universal Wood Worker, which is especially adapted for the blacksmith and wagon maker's trade where both SPACE and ECONOMY is necessary.

Write us at once for our catalogue E, giving you a complete description of the FAMOUS machine, explaining all of the different attachments which can be furmished, and are most desirable for the wagon makers' and blacksmith trades. If wagon makers and blacksmith trades. If wide: also arranged for doing two side molding, matching and sticking. you are a blacksmith or wagon maker you cannot afford to be without a machine of this kind, the only machine on the market which will save you from 15 to 20% of your labor, which will pay for the machine the first season,

We would also be pleased to send you our general catalogue.





SIDNEY TOOL CO.

SIDNEY, OHIO

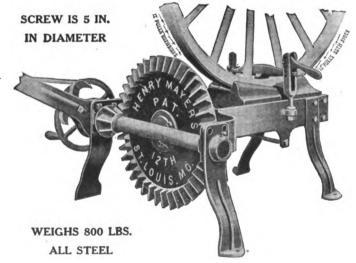
U. S. A. Universal Wood Worker, fitted up with Jointer, Shaper and Two Side Molder.

Universal Wood Worker, fitted up with the Single End Tenoning Attachment, with traveling table and hold down lever.

Mayers Tire Setter Mfg. Co. Announce!

The "Only Cold Tire Setter That Pulls Both Ways"

Will be sold this year on SUCH A BASIS that any blacksmith can buy one. Our making and selling capacity has been so increased we are going to give the trade the benefit of it by



GREATLY REDUCING THE PRICE OF THE MACHINE.

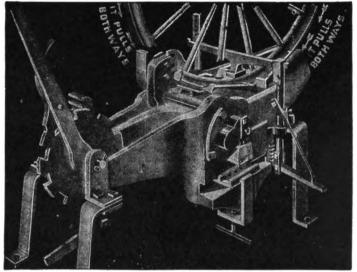
You can get one NOW. Our WARRANTY is STRONGER than ever. You try it before you buy it. You get our very LATEST 1909 model. No "old styles" to work off on you. You have only to set the tires on LESS than 50 vehicles to make it pay for itself.

It will surely interest you to hear our TERMS and guarantees. Better write us today about it.

MAYERS TIRE SETTER MANUFACTURING CO.

4028 - 30 Forest Park Boulevard

ST. LOUIS, MO.



The House Cold Tire Setter is a Trade Getter.

Dallas, Tex., Dec. 1, 1907,

I bought one in 1904, prior to that time I had very little work, but after that I had worlds of it—for instance, I set 4,000 tires the second year and I got their other work, too, don't you forget it. I have set 117 tires in one day.

L. D. BUSBY.

They Never Wear Out.

Bedford, Pa.
I have used my House Cold Tire Setter constantly for 7 years. It has

THE HOUSE COLD TIRE SETTER

UNCLE SAM'S CHOICE

THE HOUSE COLD TIRE SETTER is the one to buy, and don't be deceived by big sounding ads, for some men have no regard for truth, and besides, if required, you can try ours in your shop at our expense, though your neighbor likely has one, for there are about 3,000 in use. This is the real proof also that ours are the best, for if others are as good they would have as many in use. They certainly advertise the biggest.

The following evidence shows why men buy ours:

Waco, Tex., Feb. 4th, 1909. The House Cold Tire Setter is a Money Maker.

Before I bought one seven years ago, I was poor and working in my shop alone, but now I work 18 men and have built a good two-story brick shop. The House Cold Tire Setter is responsible for it all. It has certainly kept the clear dollars dropping into my pocket,

A. B. GARBER.

never been out of fix nor cost me one cent for repairs and I would not sell it for any price if I could not get another.

F. H. BRIGHTBILL.

See What Uncle Sam Says.

Ft. Sam Houston, Tex.

The No. 3 House Cold Tire Setter which the Government bought in
1907 does all our work with ease. It is at once a great time and labor saver.

D. W. KILBURN, Captain and Q. M. 26th Infantry.

We have good evidence to show that the Government has not bought nor put in any cold tire setter but ours within the last three years, therefore, any claim to the contrary is unfair and misleading.

The real season is on now, the 7 wet years are past and the 7 tire setting years are here, so there is no time to lose. Write us at once.

HOUSE COLD TIRE SETTER CO., 216-218 S. Third Street, St. Louis, Mo. J. F. HOUSE, 201 Church St. Toronto, Ont., Canada.

INSIST BUY ON **FROM** "STANDARD" **YOUR CALKS DEALER** STANDARD NO.2 LONG **FRANKLIN** Joliet, III. STEEL WELDS EASILY Cambridge, WORKS Mass.

Blacksmiths

We can furnish you Knives, Sections, Guards, Rivets, Plates, etc., to fit McCormick, Deering, Plano, Milwaukee, and other Mowers and Binders.

Also Buckeye Mower Repairs Weber Implement Co., 415 N. Main st., St. Louis, Mo.



STEEL STAMPS

Steel Letters and Figures **BURNING BRANDS** Stencil Dies, Stencils, Etc.

Geo. M. Ness, Jr., 61 Fulton Street, N. Y.

Price List sent upon application.





BUGGY TOPS, \$4.60 TOP BUGGIES, \$35.00 RUNABOUTS, \$32.00 Cushion Backs, Storm Fronts, Poles & Shafts. Write for 100-page Catalog. BUOB & SCHEU. 500-520 Court Street,

Cincinnati, Ohio

HELLER'S CELEBRATED AMERICAN HORSE RASPS. "Tools That Wear" will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excel-lence All made from our own Production of Special Refined Clay Crucible Steel and tempered by a Secret Process, New Catalogue Mailed Free on Application. HELLER BROTHERS CO., Newark, N. J., U. S. A.



Try Borax-ette for Welding Toe-Calks

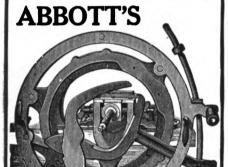
THEY WON'T KNOCK OFF

It makes steel weld like iron. It has no equal for welding tires, axles and springs

FOR SALE BY ALL DEALERS

SAMPLES FREE

CORTLAND WELDING COMPOUND CO., Cortland, N. Y.



Little Giant **Hub Borers**

AND Abbott's Box Puller

Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers' Machinery

PHINEAS JONES & CO., Newark, N.J.

General Agents for the Eastern States



The Bruce Malleable Wagon Standard

Tested thoroughly and guaranteed strictly as represented.
Note its great advantages over the old style.

1. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.

and of bolster, which in old style is weakened by mortise.

3. The Malleable Iron Standard has a 3½ in. face at base,
which prevents wear on wagon box, while the old style has only

4. Great time saver. Can be attached to bolster in one fourth the time required to put on wood stake. Adapted to new and repair work.

If you have never tried the Bruce Standard, write today and ask for prices.

A. H. HARSHBARGER, Danville, Ill.



Insist on the "Crescent" brand and if your jobber cannot supply you write us direct. We manufacture a full line of High Grade Agricultural Steel Shapes, Fitted and Bolted Plow and Lister Shares, Merchant Plow Shares, Cultivator Blades, Subsoiler Blades, Landsides, etc., etc.

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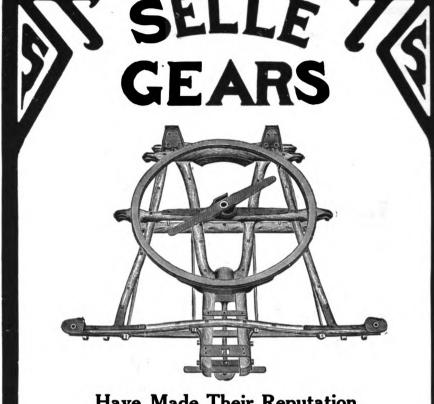
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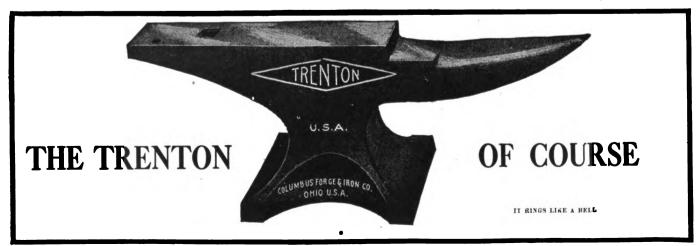
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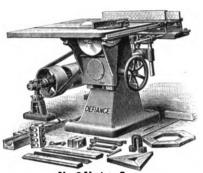
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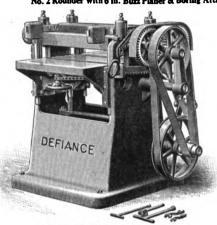
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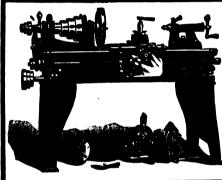


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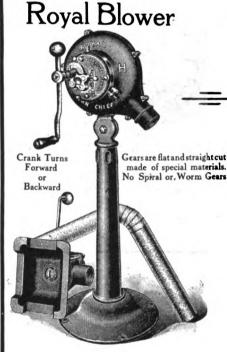
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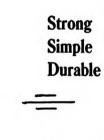












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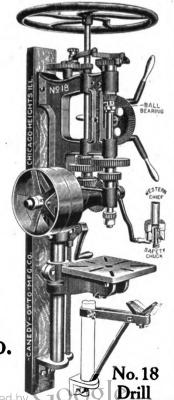
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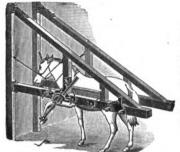


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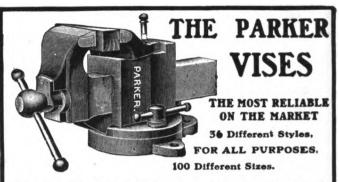
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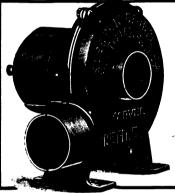
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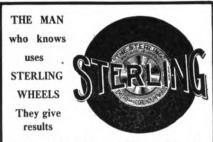
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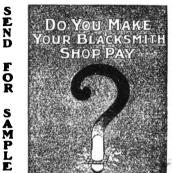
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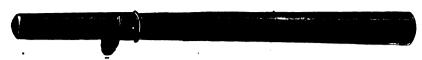
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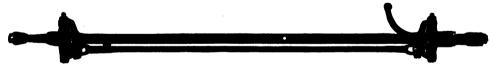
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Every Line of Interest.

Just because you are not a tool smith is no reason why the articles in the tool smith department won't interest or be of some value to you in some measure. Even if you are not a horseshoer there is no reason why the reading of the articles on shoeing cannot give you some ideas or help you in some way. The special articles under department headings are not written for any particular classes—they are for every reader of the paper, be he vehicle builder, tool smith, ornamental iron worker, horseshoer, auto repairer, gunsmith, or any of the many other craftsmen who regularly read "Our Journal." Every subscriber, from apprentice to foreman and shop owner, should read every line of every page of every issue. It's not so much what you read as how you read it. A man may read every craft text book he can lay his hands on and still not retain any of the suggestions and practical information which such books may contain. It is necessary to study while you read to get the full value out of a printed page.

Asking Questions.

While our "Queries, Answers, Notes" department has grown considerably, not only in size but in usefulness as well, we want to further increase the practical worth of that department. And questioners can assist us very materially in this effort by stating their queries fully and completely. Questions fully explained are half answered. It is very often necessary to guess at just what the querist means and sometimes it is necessary to write a letter requesting further information on the matter in question. Much valuable time is lost by these delays, which could be easily avoided by a full and complete description of the question in the first place. Readers will assist us greatly by bearing these points in mind when asking for information. You cannot give us too much detail when requesting information on any subject connected with the smithing craft.

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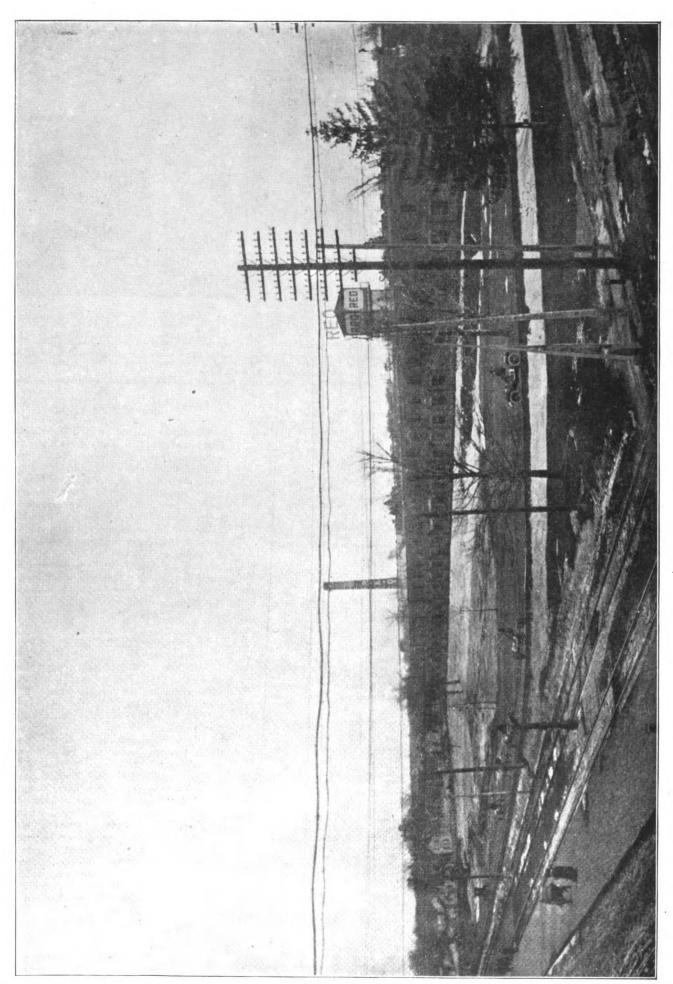
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[Still On the Job.

"Our Folks" are generally well acquainted with the Pink Buffalo Stamps and their value as protectors—as wielders of "The Big Stick." And while the little pink squares have been doing excellent work we have never felt called upon to say just exactly what they have done. It occurs to us, however, that "Our Folks" would undoubtedly be interested in some of the jobs accomplished by the Pink Buffalos. Allow us to quote from a letter recently received, "I am glad to tell you that the Company has arranged matters satisfactorily. I want to thank you for your assistance in bringing them to time." We have never yet been asked to remind any of our advertisers of our "Honest Dealings' paragraph, because we will not knowingly allow any swindler, faker or questionable business house to place an advertisement in our columns. They haven't money enough to buy the space. even had they the wealth of a Carnegie or a Rockefeller. The little pink squares are doing their work faithfully and we want you to use them liberally. We have a big supply on hand and they are free for the



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Overhauling an Automobile

What to Do and How to Do it

RICHARD KANE



OME smiths will, no doubt, have an attack of "stage fright" when called upon to overhaul an auto. But

simply because the car happens to be a big one is no reason why you should have fears as to the outcome of your work. The main point in automobile work, and in fact any work, is familiarity with the machine or other article in hand to be cared for. solid portions of the body. Also determine, before pulling on the hoist, whether or not all bolts and nuts that hold the body to the frame have been taken out. Having removed the body, place it out of the way, where it will not be marred or scratched and where every time you make a move you won't hit it. Now the hood over the engine may be removed, if it is a large car. Or, if a small runabout, the hood over the water tank and radiator. The car will now appear somewhat like the engraving, Page 172,

the motor; the bolts holding the cylinders to the crank case, the exhaust piping, the pipes for fuel, the wiring to the spark plugs and the numerous oil feeds. These must, of course, be carefully disconnected.

After removing the motor it may be taken down. This should, however, be done carefully and intelligently. Pick out a clear bench or floor space and then take down the motor, placing each part around you so that it can be readily taken up in about the position



IN CAMP

Of course, the first thing to be taken from the car is the body. This can be easily and quickly removed with a block and tackle. A self-locking hoist will be found very handy for this purpose. Very practical ones can now be purchased at reasonable figures. The body should be held by ropes attached at four points, care being taken to see that the ropes are attached to



MOTORING THROUGH THE FOREST

with all its parts easily discernible. "Begin at the beginning" is not more pertinent than right at this stage of overhauling the car. No doubt, the novice will hesitate as to just where to begin on the chassis, but if we start dismantling with the radiator we will not be far from making a correct beginning. So, start there and disconnect the water piping and place the radiator to one side.

Before going further it may be well to caution the novice to make absolutely certain and beyond all doubt that the part or parts that he is removing are free from all holdings and fastenings. If extreme care is not exercised in this respect a frail part may be very seriously damaged or may be broken. Also see that your hoist is pulling directly vertical when you attempt to raise any part of the machine, especially any part resting among wires or small piping, such as the motor.

In taking out the motor the selflocking hoist will again be found very handy. There are many fastenings to it claims in the assembled machine. This will make re-assembling extremely easy even for the novice. Mark the various parts in a way so you'll understand where they belong. In the case of double-cylinder construction mark the casting so that it will not be

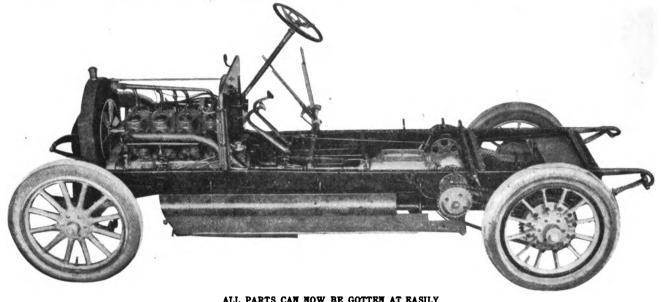


A SHOT FROM THE SEAT

assembled in the machine just opposite to the way it should set. If each casting is taken off and placed on the floor or bench in approximately the posiiton it occupies in the car little or no difficulty will be experienced in re-assembling.

Remove the valves from the motor. examine the springs and also the valve seats. If these latter need regrinding, now is the time to do it. that it may be replaced exactly as originally. Clean the ring grooves carefully and also the rings themselves before they are replaced. Should the head of the piston carry a deposit of carbon or soot scrape it carefully. Look carefully to the bearings at both ends of the connecting rods. If either is in any way affected through wear. or otherwise, repair the failing now.

The transmission should be gone over very carefully, cleaning out all old oil and grease, examining all parts for wear and replacing such parts as need replacing. If the clutch needs refacing do it now. Also see that the gears in the transmission case work as they should. If they do not engage each other smoothly and easily there must be some trouble. Repair it



ALL PARTS CAN NOW BE GOTTEN AT EASILY

Examine the faces of the cams operating the valves, also look to the rollers to see that they have not worn down to such a degree as to cause the valves to act improperly. If the stems of the valves have become worn and are too short they may be lengthened by drawing out. This should be done carefully, however, and the stem must be exactly and perfectly straight before it is replaced.

Look carefully into the valve parts and also the combustion chamber for dirt, soot and carbon deposit. Remove the spark plugs and clean carefully and thoroughly. An old toothbrush is just the thing for cleaning plugs. Don't clean plugs with sand or emery paper. This makes them rough and all the more likely to soot deposit.

Deposits are likely to form in the water jackets. Or there is a possibility of their rusting. Whatever is found there should be removed and the jackets put in good condition. To sum up, put the cylinder castings in just as near the shape and condition they were when new as it is possible to get them.

Now the same procedure may be followed with the pistons, the connecting (rods, wrist pin bearings and the like. Examine the piston rings and remove them, marking each one so

Should these bearings be found in good condition it is best to let them alone.

Next in order are the cam shaft bearings. These should receive the same careful attention accorded the other parts already taken up. Do not leave the motor or power plant until every part, corner and crevice has been carefully examined and cleaned.

The steering gear is a most important part of the machine and should be subjected to careful scrutiny. Every part of the steering mechanism should be gone over carefully; worn parts should be replaced and every part carefully readjusted. Every rod, pin and joint should be thoroughly tested to see that it is in perfect order.

The ignition and lubricating systems may then be taken up and then the transmission. We need not dwell at length upon the two first mentioned as the general smith has had experience along similar lines in his gas engine. Suffice to say that a careful examination of the wiring is very necessary. If any part has worn bare replace it or wrap it with tape and take measures for the prevention of such wear in re-assembling. The connections should be carefully examined and new terminals fitted where necessary. Then look to the timer, the coils and the vibrators.

before replacing cover to gear box. If a chain driven machine, remove the chains and clean thoroughly. Soaking them in kerosene for awhile will loosen the grit and dirt. The chains may then be dried and then placed in a melted mixture of tallow and graphite. After hanging in the air a time allowing the graphite mixture to solidify the chains may be wiped and replaced.

The hub clutches and the brakes may now be looked after. Examine the wheel bearings and give them the same thorough cleaning that you have given other bearings. Look after the brakes carefully, examining the faces of the drums and bands and adjusting the bands correctly, if they have become changed in any way. Examine all the joints in connection with the brakes and if any show undue wear fix them now. Too much depends upon the brakes to let any part of their mechanism go untouched.

We have now gone over practically the entire car, having detailed everything but the smaller and minor parts. which the repairman will naturally care for. While the overhauling of a car in a thorough manner means considerable work, it will enable the novice to get a thorough understanding of the construction and general makeup of the automobile. Every detail

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will be brought to his attention, and while the various makes differ considerably in some instances the gasoline types are sufficiently similar to enable a man to get a good idea of their construction from one good, standard car.

Don't run the chain dry. Frequent



Don't Screw Spark Plugs up too tight in a hot cylinder. They are likely to prove difficult of removal when they are to be taken out. Screw them in just tight enough.

G. W. H., Ohio.

'Tis Poor Policy to experiment with clutch lubricants. That is, it's poor for the clutch, the car owner and your business. Get some reliable oil and stick to that. It's safer in every way. R. A. P., New York.

Be Thorough in Your Repairing or overhauling of a car. Just because the owner said nothing about the brake is no reason you should not look at it. See that it is working right. If it isn't, fix it and tell the owner. These little things help build P. M. Ross, Illinois. trade.

Vulcanizing can be done by the general smith, and with the numerous small vulcanizers now on the market the general worker will do well to grasp this opportunity for increasing profits. Not only can the automobile public be looked to for work, but bicycle owners as well. A.O.W., New York.

A Pit is a Great Convenience where considerable automobile repairing is done. It enables the repairman to examine the under workings of a car very easily and saves much time and trouble. A pit 3 feet and 6 inches wide will be found convenient for most all cars. It should be as long as possible so as to make it unnecessary to move the car when getting in and out of the pit. It should also have its edges raised above the floor level perhaps 3 or 4 inches all around so as to prevent a car from being driven into it. Care must be exercised to keep the pit as free as possible of gasoline vapors, and never allow an open light or flame in the pit. Locating the pit near the doors or windows will enable you to work without an artificial light. M.C.R., New York.

Don'ts for the Motorist and for the Repairman.

Don't run the engine with late spark. Don't forget to watch the oiling system carefully.

Don't forget that oil is a good thing to use on bearings.

Don't race the engine on low speed or when car is standing.

Don't try to make a machine run better when it is running all right.

Don't fail to use a high grade of The best oil is the cheapest in oil. thė end.

Don't crank engine until the spark is set late or it may "kick" and possibly sprain your wrist.

Don't fail to keep tires pumped up. A tire that is not properly inflated will soon rim-cut.

Don't keep on running when you hear an unusual noise about the machine. Stop and locate it.

Don't start a car on a long trip without first testing the batteries. Batteries will run down and occasionally have to be replaced.

Don't crank continuously. If it doesn't start from one to six turns, there is some cause for it. Look and see what you have forgotten to do.

application of graphite and oil and an occasional thorough cleaning with gasoline or kerosene will insure a quiet and smooth-running chain.

Mud Guards as Tool Stands.

J. C. LYNCH.

When repairing a car from which the mud guards have not been removed it is, indeed, an exceptional repairman who can resist the temptation to use them as a resting place for his tools. The smooth, even surface is so convenient for the hammer, wrenches, screwdrivers, files and the like that when not in the repairer's hand they are naturally laid upon the mud or wheel guard. Naturally, this practice is not the best in the world for the high finish on the guards, and if the car is sent to the repairer's very often the guards will soon show up the abuse. Of course, on some cars the guards are easily removable, but even on those where the guards are tightly fastened the repairer will find himself well repaid to spend ten or fifteen minutes to remove the wheel guards.

However, if the guards are attached in a manner which does not allow for their easy removal, or where the repairs are not likely to be of long duration, it is well to lay a piece of felt or thick cloth on the guards. And not by any means a small item in this connection is the very good impression made on the car owner by this simple caution. It is sure to impress him

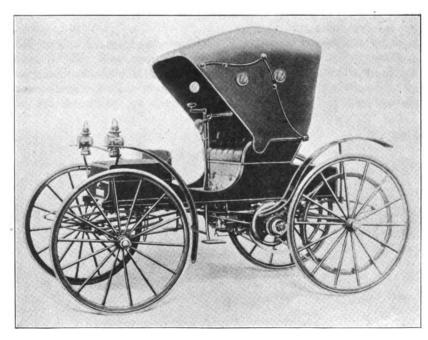


FIG. 1.—THE HOLSMAN MODEL 10—K Digitized by GOOGLE

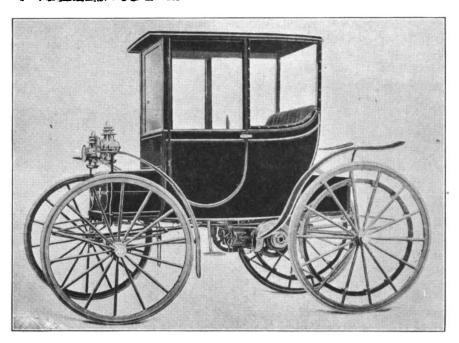


FIG. 2.—THE HOLSMAN MODEL H-15

favorably, and will without doubt result in more calls from him.

The Holsman High-Wheeled Automobile.

The accompanying engravings show the Holsman high-wheeled automobile. In Fig. 1 is shown their Model 10—K, which is described as a two-cylinder, 12-horsepower runabout. In Fig. 2 is shown a Model H—15, which carries a four-cylinder, 26-horsepower motor. In both models the drive is direct from the motor shaft to the wheels through chains. One lever controls and operates the high, low and reverse. The motor and transmission, including mufflers and carburetor, are made in one piece and so attached that the entire machinery can be easily and quickly removed.

The motor and parts are shown in Fig. 3. The carburetor is marked A. From here the fuel is led through the pipe to B where it is distributed to the

four cylinders. At CCCC are the exhaust ports. The exhaust gases being led to the mufflers located at DD. The fly wheels are shown at EE, while the left-driving sheave F is shown adjusted

shown connecting the four spark plugs and the timer.

How to Set the Valves on a Single-Cylinder Motor.

The Cadillac.

The accompanying engravings show the valves of a four-cycle Cadillac motor correctly set or timed. The piston travel, as shown in the engravings, is five inches.

The beginning of the first or suction stroke is shown in Fig. 1. At one sixteenth inch past the center the inlet valve A begins to open. This allows the vapor, supplied by the carburetor, to be drawn into the cylinder, the motor running as indicated by the arrows. During this stroke the exhaust valve B is closed. The inlet valve A is opened by the eccentric rod, its movement being controlled by the eccentric on the secondary shaft D. This shaft is driven one half of the speed of the motor by the two to one gear E and pinion F.

The beginning of the second or compression stroke at the closing point

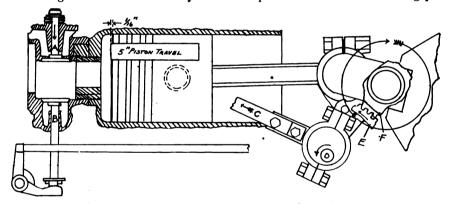


FIG. 1.—THE BEGINNING OF THE FIRST OR SUCTION STROKE

for high speed, the left one at G being fixed for low speed. The spark plugs are at HHHH, while the timing device is at J, from which the igniting current is carried by means of the cables of the inlet valve is shown in Fig. 2. Both valves are closed during this stroke. The piston traveling, as shown by the arrow, compresses the charge, which is ignited at or before the end of the stroke by the spark plug. The igniting of the charge drives the piston forward to the position as in Fig. 3. During these two strokes, the compression and working strokes, both valves should be closed.

At the end of the working stroke, as at Fig. 3, the exhaust valve B begins to open and during the fourth or exhaust stroke the gases are expelled from the cylinder. The exhaust valve B is operated by the cam I which pushes the rocker arm J and lifts the valve. In Fig. 4 the exhaust valve has just closed. The shaft is one thirty-second inch past dead center. The inlet

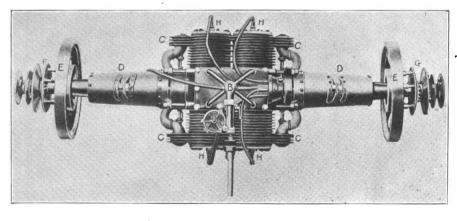


FIG. 3—THE HOLSMAN MOTOR AND PARTS

valve A will open one thirty-second of an inch later, admitting new vapor as in Fig. 1, after which the entire cycle of events is repeated.

Understanding the operations of the valves and their relation to the travel of the piston it will be easier to explain how to time the valves.

To set the valves after the shaft has been removed proceed as follows: first turn the crank shaft so that the center of the crank pin will be in the same horizontal plane with the center of the crank shaft, having the crank pin at the same time extending back toward the cylinder of the motor. By referring to Fig. 4 you will see that the crank pin is in very nearly the position suggested, although the crank pin must be dropped a little lower than shown in the engraving to bring its center in the same horizontal plane as the center of the crank shaft. Then mesh the valve gears so that the commutator key, which is in the end of the commutator shaft, will be in a vertical position, and will point either

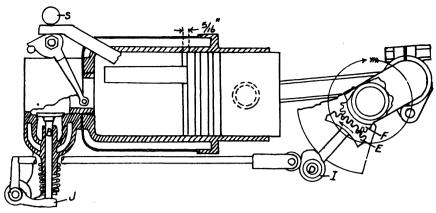


FIG. 3.-THE END OF THE WORKING STROKE

slowly forward and turn the exhaust push rod at the same time. Take care to detect the instant the exhaust push rod begins to bind. This position is termed the opening of the exhaust valve, as a valve in this position will be opened with the slightest movement of the flywheel. To make sure that the motor has not turned past the point desired, insert fingers in the spark plug hole and see that the ex-

would be five sixteenths of an inch, as shown in Fig. 3, but if the engine has been running for some time the valves would be expected to be slightly out of tune. In this event the exhaust would be opening one eighth or one sixteenth of an inch instead of five sixteenths.

Next, it will be necessary to time the closing of this valve. Continue the movement of the flywheel until the exhaust push rod begins to loosen, making sure that the exhaust push rod bears slightly on the valve mechanism and that the valve does not twist on its seat. This we call the closing of the exhaust valve, as a valve in this position has just closed.

Next, insert the rule and back up on the flywheel and note the distance that the piston pushes the rule, which should be one thirty-second of an inch. On an engine that has been run long. the valves would probably be closing on dead center. To recover the time lost by the slight wear of the valve mechanism, it is necessary to remove the exhaust push rod and pene in the center. This will lengthen the push rod slightly and give the engine the timing it had originally. If, in trying to determine the opening or closing of a valve, the flywheel has been turned too far, back-up and begin

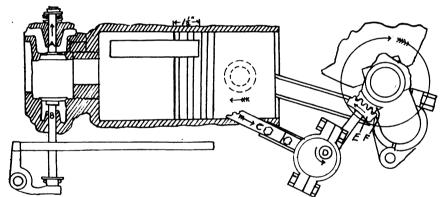


FIG. 2.—THE BEGINNING OF THE SECOND OR COMPRESSION STROKE

directly up, or directly down, when the crank pin bears the relation to the crank shaft above specified. Use special care to make sure that this commutator key is practically vertical and that it is not standing one tooth away from the vertical position.

After setting the cam shaft according to the above instructions it will be necessary to make a test to make sure that the cam and crank shaft gears are meshed correctly. This can be readily done by inserting the round exhaust push rod. Next put in the exhaust bell crank and pin which form the connection between the valve stem and push rod. After this has been securely fastened it will be necessary to move the flywheel forward. Take hold of the exhaust push rod which will turn freely except when performing its duty of lifting the exhaust valve. Move the fly wheel

haust valve is on its seat and does not turn freely.

Next insert a rule allowing it to bear firmly on the piston. Without removing the rule move the flywheel forward and note the distance the rule has traveled. This on a new engine

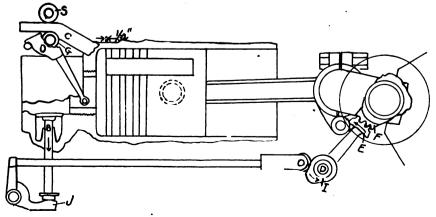


FIG. 4.—THE BEGINNING OF THE NEXT CYCLE

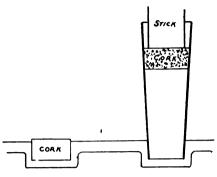
over again as the back lash must always be out the way the engine is running. If a valve is opening too early and closing too early or opening and closing too late, it is a sure indication that the cam shaft gear does not bear the proper relation to the crank shaft, and this gear must be turned one tooth in the proper direction and re-tested before any satisfactory results can be obtained.

When timing the inlet valve, disconnect the throttle cam rod, and with the right hand hold the throttle cam open and down, as it would be when the throttle is wide open. Turn the flywheel in the direction in which the motor runs until the inlet lever roll S, Fig. 4, begins to bear on the inlet push rod C, Fig. 4. Insert the fingers in the spark plug hole and see that the inlet valve is not off its seat. The inlet push rod at the least movement of the flywheel will now start to open the inlet valve. However, stop in this position and, if the engine is new, you will find the inlet valve opening one sixteenth of an inch past center, as in Fig. 1. To measure this distance insert a rule and turn the flywheel backward, noting the distance that the piston pushed the rule outward. This will be the time the inlet valve opens after the piston has passed the center. An engine that has been run for some time will probably open one eighth or three sixteenths past center. An engine in this condition is out of time.

The closing of an inlet valve is determined by turning the engine forward, making sure that you are again holding the inlet lever down and open, as above. Turn the flywheel forward until the inlet lever roll begins to loosen, but is still contracting on the inlet push rod. Make sure that your valve is closed; try again to twist the inlet valve, which should be on its seat. This we term the closing of the inlet valve, and on a new engine would be one and one half inches past center, Fig. 2.

Next, insert your rule and turn the flywheel backward, compelling the rule to follow the piston without slipping. The distance the rule travels in will be the distance past the center that the inlet valve is closing. When the cam shaft is set correctly, an inlet valve that is out of time will open late and close early. Both these errors may be corrected by removing the two screws, clip and shim in push rod C, Fig. 1. In all probability you will have to elongate the holes in the

push rod in order that it may be pushed up slightly to produce the original timing of the inlet valve. After elongating the holes it will be necessary to make a new shim by filing down a piece of one-quarter inch square stock. One hundredth or one sixty-fourth of



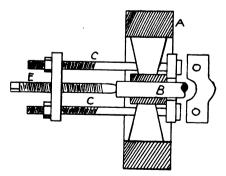
CORKS ARE EASILY INSERTED WHEN YOU KNOW HOW

an inch is usually enough to put a valve in proper time. One who is familiar with the setting of a valve can determine the size of a shim at once, but a beginner will probably have to make two or three trials.

Another Wheel Puller.

H. J. MILLER.

In the April issue, Mr. F. J. Fielding gave a description of a wheel puller for the automobile repairman. The accompanying engraving shows one we use, and which anyone can make from scrap material. In the engraving A is a section of the flywheel, while B represents the crank shaft. The rods CC of the puller should be liberally threaded at both ends so as to make the device suitable for use on engines



EVERY REPAIRMAN SHOULD HAVE A WHEEL PULLER

and wheels of different dimensions. The piece D is shaped, as shown in the face view, so as to have the pressure exerted directly in the center of the wheel. The end of the center screw at E is squared to receive a large wrench. In pulling a flywheel or

road wheel from its shaft, turn the rod E and not the rods CC. This insures pulling the wheel off straight, and prevents any tendency to strain the wheel or the shaft by pulling on one side and then on the other, which would occur if the rods CC were used.

How to Replace Corks in Brake Drums.

S. J. KELLY.

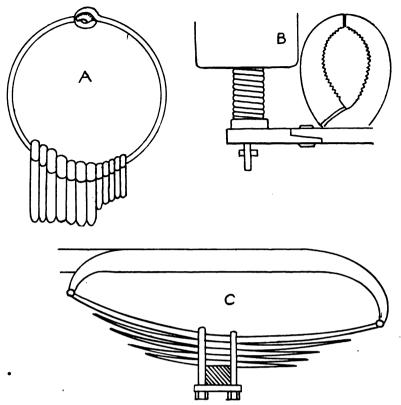
Many of the brake drums are now fitted with cork inserts, and it is important that the repairman knows how to replace these corks. It is simply impossible to drive the corks in unless you know how. To attempt the operation with a hammer will result principally in bruised fingers, ruffled temper and a battered, but unplaced, cork.

An easy method of inserting these corks is to get a tapered tube, the small end of which will just fit into the hole into which the cork is to be placed. The other end should be large enough to admit the cork easily. Now soak the corks in very warm water, not hot, and drop one into the tube. Insert the tube in the hole for the cork and with a round wooden stick force the cork into place. Pull the tapered tube back on the stick before lifting the stick from the cork. You can in this way insert the cork easily and quickly and without injuring the corks. The accompanying diagram of the simple tools required to insert the corks will make the operation plain.

Some Practical Hints for the Automobile Repairman.

J. C. THOMPSON.

The first rule in the automobile repairman's handy book should be: "First find the trouble." This may seem rather foolish advice, but the misdirected tinkering and fixing and the fussing around at random done by some repairmen, when something is going wrong or not going at all, is enough to make the experienced repairer weep. Go at the job from the right end. Don't approach it from the side, the rear or the top, as it were, but face it boldly. Get right down to "blue tacks," and go at things in a business way. If it requires considerable testing to learn just exactly what the trouble is, do that testing intelligently. Don't test the cooling system when common sense tells you that the trouble is with the ignition



SOME PRACTICAL HINTS FOR THE AUTOMOBILE REPAIRMAN

or fuel system. A good start is half the battle and a thorough understanding of just what is the matter will simplify the correcting of that trouble.

And now to detail just one other rule for the auto repairer. This second rule is also very simple. It is just this: Use common sense. The general smith making a business of repairing about everything from a stew-pan to a threshing machine, is, of course, naturally using common horse sense on every job. It is second nature with him, and he will naturally go at an auto job right.

An easy way to keep cotter pins so you can, on a moment's notice, pick out just the size and kind you want, is to put them on rings made of brass wire. If your stock of cotters is sufficient a ring may be used for each size or for perhaps two sizes. But if your needs do not require a large assortment keep them all on one large ring and graded according to size as shown at A, in the engraving. In this connection it is also well to remember that a wire nail may sometimes be used in place of a cotter pin which cannot be supplied.

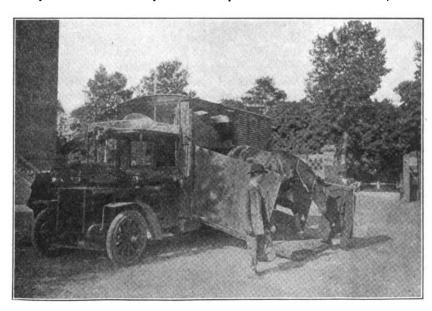
Valve grinding is, without doubt, recommended for more motor ills than any other three remedies combined. When the motor coughs in an unaccustomed tone, or acts queerly in any way, the would-be expert gets out

his valve-grinding outfit and begins operations. Don't grind the valves unless you are sure they need it. When you have determined that the valves do need grinding, see that the grinding is done correctly. Most writers on the grinding of valves caution the operator to be careful about letting the oil and emery run into the port. How this is to be done they do not say. The writer has found that a piece of waste stuffed into the port will effectually catch all emery and oil likely to run into the port. The

waste or rag should be crowded in tightly so that when it is withdrawn it will wipe out all the "overflow." And again, valve grinding directions usually instruct the operator to use a heavy oil. The operation will be much more satisfactory and more easily accomplished if the emery is used with common kerosene. This has a tendency rather to promote the cutting qualities of the emery, while heavy oils are intended as lubricators—just the reverse quality. The advice to turn the valve back and forth and not all the way around is well founded, and should be strictly adhered to. The actual operation of valve grinding has been explained so often that we will not go into its details here.

In connection with these hints on valve grinding may be mentioned several kinks that may help the repairman. If it is found that a valve is not working correctly by reason of shortness in the stem the valve may be removed and the stem heated and Another, and perhaps drawn out. simpler way, is to draw the temper of the end of the stem and then drill a small hole directly into the end. Tap the hole and screw in a small setscrew. Then cut down the set-screw, if necessary, to give the required length to the stem.

For the removal of the valve it is always best to have a valve removing tool, but if this is not to be had take an ordinary gas pipe pliers and place the jaws around the valve stem just below the washer. Then push the spring up, see B in the engraving, holding down on the stem with the other hand. When the washer has been pushed free from the cotter, close the



IN FRANCE THE AUTOMOBILE IS USED TO TRANSPORT RACE HORSES

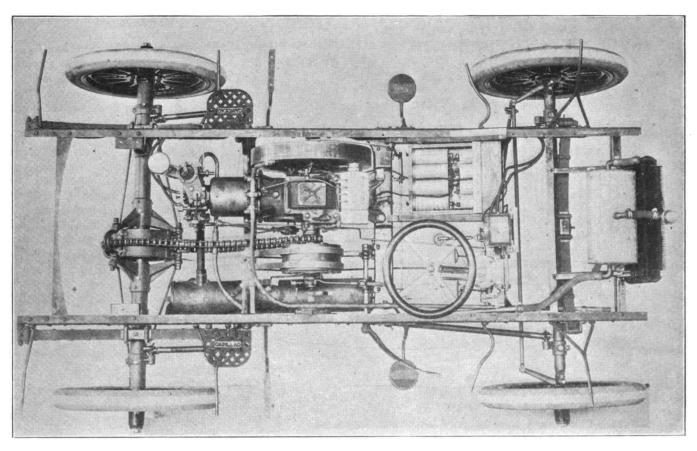


FIG. 1.—THE CADILLAC SINGLE-CYLINDER CHASSIS FROM ABOVE

jaws of the pliers down on the valve stem, thus holding both stem and spring while the cotter is removed.

It should be remembered that valve springs do not retain their maximum of efficiency forever. Weakening of the valve springs will result in a loss of power. The remedy is new springs.

And talking of springs reminds me: car springs sometimes squeak very annoyingly. The car owner will oil and grease and lubricate until he is blue in the face, but the mysterious squeak will persist. Perhaps as a last resort he will take his car to the repair shop. If Mr. Repairman is wise he will tell the owner to call later, and then will inspect the car for out-of-the-way squeaks. Having determined that all the machinery is lubricated he

will turn to the springs. To lubricate these lift the carriage body, by means of jacks, off the springs. By doing this the leaves of the springs will come apart, see the engraving at C, and oil or grease can be easily put between them. This will not only effectually stop the squeak, but will cause the car to ride very much easier.

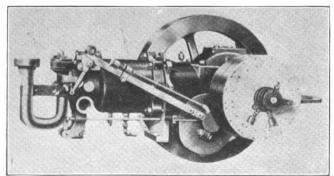
In making exhaust joints or in fitting the exhaust piping together don't suppose that any old packing will do. Don't use string or wicking, but use good asbestos sheeting. Cut this to size exactly as if you were fitting an asbestos gasket to the head of your gasoline engine. Cut the holes for bolts and for an unobstructed passage for the exhaust gases. Then place it and screw up the joint as tight as

possible. The pressure exerted by the exhaust at all joints is very considerable, and strong joints are necessary.

In working about a motor the repairer will find a painter's soft, thick brush of great help in removing dust and dirt. Don't attempt to use cloths or waste—there are too many little hooks, pins and projections for the cloth to catch on.

Cylinders may be cracked not alone by the freezing of the water in the water jacket, but by too rapidly cooling a heated engine it may be cracked. This rapid cooling may be brought about by pouring cold water into the radiator of a hot motor.

Vehicles repairers know well the value of painting an ordinary wheel rim just before putting on the metal



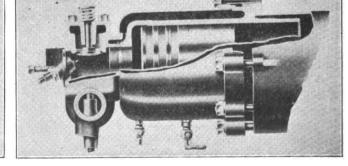


FIG. 2.—THE CADILLAC SINGLE-CYLINDER MOTOR

FIG. 3.—SHOWING WATER JACKET OF MOTOR CYLINDER
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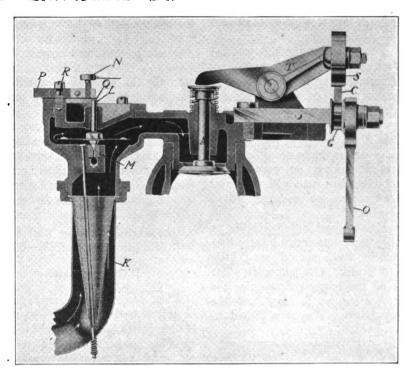


FIG. 5.-A SECTIONAL VIEW OF THE CADILLAC CARBURETOR

tire. It keeps the moisture out of the wood rim and prolongs the life of the wheel. The rims of the motor vehicle should also be painted, but for another reason. A painted rim will prevent rust and, as rust is very destructive to the fabric of a tire, painting will save the tire. Clean the rims thoroughly of all rust and dirt and then treat to a coat of japan. After thoroughly drying; give a second coat. Do not replace tires until the japan is absolutely dry and hard.

Rusting on other parts of the car may be effectually prevented by enameling. There are numerous surfaces, the flywheel, fan, pulley arms, brackets, rods, collars and elbows that can be enameled to advantage. But when enameling get a good enamel or the job will be better if left undone. Get an enamel that will dry good and hard. Not one of the cheap, quickdrying kinds.

In closing, let me say to the readers of The American Blacksmith that the automobile repair proposition is no more difficult than some things that the general smith goes up against every day. It is worth getting next to as the profits are much better than the average smith-shop work.

The Cadillac Single-Cylinder Car.

The accompanying engravings show a Cadillac single-cylinder chassis and also several detailed parts of the car's mechanism. In Fig. 1 is shown a top view of the chassis, showing the frame, motor and under-carriage parts of the vehicle. In this engraving the

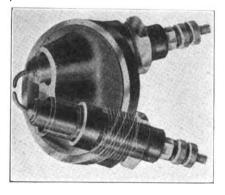


FIG. 4.—THE SPARK PLUG

various levers, water piping, wiring, oiling, driving and brake mechanisms and the fuel piping can be traced. Those readers who have followed this

series of motor-car descriptions will have no difficulty in tracing these various parts in the under carriage and we will, therefore, devote more space to engravings and descriptions of the motor, carburetor and transmission.

In Fig. 2 is shown the Cadillac single-cylinder, ten-horsepower motor, devoid of its fuel, exhaust and igniting connections. In Fig. 3 is shown in detail the copper water jacket and cooling system. It will be seen from the engraving that the Cadillac cylinder is cast separately and without a cooling jacket, which latter is formed by clamping a copper sheet firmly around the cylinder proper. This detail of the water jacket also shows the spark plug in position and the inlet and exhaust ports. Fig. 4 shows a Cadillac double insulated spark plug.

The sectional view of the carburetor or fuel mixer is shown in Fig. 5. The gasoline from the storage tank enters the mixer through the valve M and drops into the wire mesh at K. Air is drawn in through the intake tube and evaporates the liquid or changes it into a vapor and the mixture is then drawn up and through the inlet valve at A, and then into the combustion chamber of the motor where it is ignited by the electric spark from the spark plug. The levers or arms, marked T, S, C, G, O, operate the valve A, so that the fuel is admitted to the combustion chamber just at the right time, or when the burnt gases have been expelled from the cylinder and the spark plug is about to fire. The adjusting screws at R and N, in combination with the rod P, the spring Q and the valve stem L, are for regulating the flow of gasoline into the wire mesh K.

The Cadillac transmission is shown in Fig. 6. It is of the planetary type. Its operation may be explained as follows: The driving gear D is fastened tightly to the engine shaft, which latter

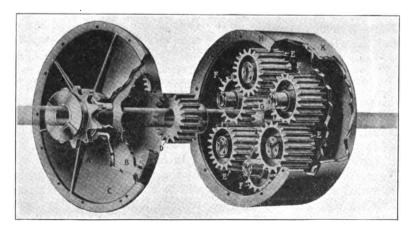


FIG. 6.—GEAR CASE SHOWING GEARS OF PLANETARY TRANSMISSION

is shown in shadow. When assembled. the cover C of the case and the case itself at H form an oil reservoir, enclosing all gears and working parts. If the case H is held by its brake band when the driving gear is rotating all the gears in the case except the large one at B run at the same speed as the engine shaft. The gear B with its driving sprocket at A runs at a slower rate and in the opposite direction. producing the reverse. If the case is allowed to revolve and the drum K is held by its brakes all the gears run at much slower speed than the engine shaft, driving the internal gear B around very slowly and forward, thus producing the low speed. If, however, the brake drum K is locked to the shaft by the high-speed clutch, the whole gear revolves and acts as an

buy them in larger numbers than ever this coming season.

The advantages of the high-wheeled construction over the low-wheeled vehicle, especially as regards travel in the country districts, are many. Not the least of these advantages is the fact that the high-wheeled car will negotiate a deeply-rutted road just as easily as the macadamized surface. The low-wheeled car, on the contrary, will not clear the road with its axles and transmission on a deeply-rutted or mud road.

The high-wheeled automobile is so much like the horse-drawn buggy that the vehicle smith should have little or no difficulty in repairing it. The wheels of the buggy-auto require the same attention as do those of the ordinary buggy. They are dished to

the agency side of the auto-buggy. It means big, extra profits for the smith who starts the first agency in his vicinity. The general smith is brought naturally in close contact with just the people who are likely to purchase buggy-autos, and he should certainly grab this opportunity for extra earnings. It's not a side-line by any means, but a line that belongs to the smith and vehicle builder, more so than to the implement dealer, who will take the chance, if you don't.

Adjusting, Repairing and Caring for an Automobile—6.

The Front Axle.

When by accident an axle is slightly bent it is better to straighten it cold. If it is only a slight backward bend any good blacksmith can straighten it. Do not under any circumstances heat any parts of cars bent by accident, but straighten cold.

Should a steering knuckle become bent it is necessary to have a gauge or jig to straighten it accurately. The eye is not sufficient to determine whether it is correct, and excessive wear of the front tire will be the result of inaccuracy in this place.

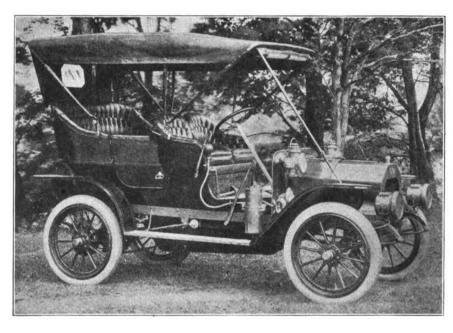
The front wheels should set at an angle of about three degrees—that is to say, the distance, center to center, between the tops of the front wheels should be about one and a half inches greater than that between the bottoms. This is to give perfect steering qualities and to save wear on the tires when turning corners. The wheels should not, however, "toe in" at the front—lines drawn along the outsides of the wheels when the latter are in a straightforward position should be parallel.

To remove the front axle, disconnect the spring shackles and ball cap which holds the triangular radius rods to the transmission frame; disconnect spring clips, spring to front frame member.

To disconnect radius rods from axle, remove screw cap and draw out rivets. In replacing, see that rivets go through both sides of tube and are tight.

Once every thirty days the axles should be carefully gone over to see that every moving part, such as bushings in spring connections, shackles, steering knuckles and hub bearings and every other moving part, however small or apparently unimportant, are thoroughly lubricated, and that all nuts and connections are secure.

If this is done, replacement of bearings should be unnecessary during the



REO TOURING CAR-5 PASSENGERS, 18-20 HORSEPOWER

additional flywheel. This description, we believe, will make the working of the planetary transmission clear to even the uninitiated.

The High-Wheeled Automobile and the General Smith.

G. W. MUSSIN.

The high-wheeled automobile or, as it is more popularly known, the buggy-auto, is without question the horseless vehicle for the farmer. It is simple in construction, easy to operate and will generally travel any road that can be traveled with horse and buggy. And let me say right here, Mr. Reader and Country Smith, that the farmers are buying these vehicles and will

give them strength and the axles are also set. The body, trimmings and much of the other fittings are very similar to the ordinary buggy. The motor is comparatively simple, and most anyone who has had any experience with gas engines and understands their principle will have little difficulty in repairing and attending to the buggymotor. The practical vehicle repairman and builder will have very little trouble in attending to the autobuggies that will naturally be brought to his shop.

As for the frame of these vehicles, anyone who can work in angle iron will be able to repair and replace any sections that may fail in service or in accident.

And last, but not least, don't forget

first year or two of a car's service. Wherever balls are used there is a liability of one splitting, so it is well to watch carefully the balls and races in the front wheels, and the slightest wear or defect in either should be followed by immediate replacement.

Ball bearings in front wheels should be adjusted so there is not the slightest play and yet so the wheel will turn freely. After tightening the lock nut. turn the wheel, as the last operation may have tightened the cones too much.

The spring clips which attach the front spring to the frame should be inspected frequently to see that the nuts are not working loose, as this will permit the axle to shift sidewise. interfering with the steering, and may result in an accident when turning suddenly.

The Steering Gear.

The gears which are arranged in the "sun and planet" form are located at the top of the post just below the hub of the wheel. By loosening the set-screw and unscrewing the knurled brass cap-after having removed the wheel-they may readily be inspected and replenished with oil. Vaseline or Albany grease is best for this place, and one filling will last six months, at least.

(To be continued)

The Apprentice Question-3.

DAYTON O. SHAW.

Then, there are those who can't do much until they know the principle of a thing. They may question the smith about iron and steel. If so, instead of getting out of patience, I would suggest that he take an hour, sit down, and explain to them how iron is made, how steel is made and how he can make steel out of iron. As the result, you will see their eyes brighten and see their interest aroused, then they will go ahead at a surprising rate. But as I have said before, many smiths are not good teachers.

In the beginning of my article I said that there were few young men learning the blacksmith's trade. I stated further that I believed there were three causes for this condition. viz.: the difficulty of getting a chance to learn all branches of the trade, specializing work, and lack of proper instruction. Now it would be folly to state a cause without prescribing a remedy. Nevertheless, while one man may prescribe I think it will take a body of men to apply the remedy.

Briefly, my remedy is a trade school especially for teaching all branches of blacksmith's work. The trade school is no longer an experiment. It is doing a great work. The course of instruction is so arranged that both the practical and theoretical branches of the trade are taught, and also the scientific principles that underlie practical work. If the trade school taught nothing but the latter it would pay one to take the course. One could then talk intelligently about the material he is working. Now the school that I have in mind is one where the student may become thorough in all branches of the trade.

This is closely allied to the plan we read of in THE AMERICAN BLACKSMITH, regarding the association which is being formed in different parts of the country. It seems to me that an association with any push could buy or rent a large shop, establish a school and make it self-supporting. I would suggest a shop where all branches of the trade could be learned, and to the blacksmith work add the paint, wheelwright and machine shops.

(To be continued.)



"Know anything about automobiles?" questioned the Editor, as Benton made himself comfortable in his chair.

Not much," returned the other, "But, I know more now than I did several weeks ago," and lighting his pipe Benton continued, "I happened into Jack Connor's shop down on the lake road and found them all busy on two big touring cars. Well, it made me feel good to see the way those men went at those cars. Jack told me he had to have them ready by ten o'clock. The party was making a record-breaking trip from Boston to Chicago and the cars were in pretty bad shape on account of the mud and bad roads. Well, they got the cars out on time and Jack's bank account swelled by a neat figure for the work. But the cars had no sooner left the shop when something happened that is liable to hap-



A MOWING MACHINE DRAWN BY AN AUTOMOBILE

pen in any shop. The boys had thrown things around very freely during the job and two empty gasoline cans were left lying on their sides and open. When the cars left, Jack naturally pulled out his pipe and prepared to spend a few minutes talking with me, but he didn't smoke, for he no sooner lit the pipe and cast the match from him when there was a flash and a boom and the shop floor was ablaze. Well, after we recovered from our surprise we hustled around to the sand boxes and had it out in a short time, but it kept us busy for awhile."
"Was anyone hurt?"

Questioned the

Editor.

"Not to amount to anything. Jack's hand was scorched, but not seriously. Well, after we put out the fire we started an investigation. Jack must have thrown the match near the empty cans and the fumes from these made an ideal mixture for igriom these made an ideal mixture for igniting. If it hadn't been for the sand boxes the shop would certainly have been wrecked."

"One can hardly be too careful in handling gasoline" returned the Editor. "Sand is an excellent thing for putting out a gasoline are compared to the property of the compared to the sand sand work."

line fire, and every shop doing auto work or carrying gasoline should have a quantity

handy."
"At Jack's shop they keep several boxes of it along the walls on both sides of the shop. The men are also instructed to use every care in handling gasoline, and now Jack has a new notice against smoking in the shop and he himself lives up to it."

Will Lowry came in at this point. Lowry runs a general shop and has just recently

gotten into the automobile work.
"Say, Benton" said the newcomer, you tell me how to clean auto chains? I've been wiping them off with a kerosene rag, but that doesn't get all the dirt out.

Why, treat them the same as a bicycle in." replied the recipe man. "Soak chain, replied the recipe man. the chains in kerosene or gasoline until the dirt and grease are well loosened. Then take a stiff brush and brush the dirt out of the links. Now, wipe the chain and warm it to dry it. Then, take about two pounds of beef tallow, a half pound of black graphite and about half a pint of lubricating oil. Mix these in a pan and heat them, stirring well. Then place the cleaned chain in the compound and let it remain long enough to allow the hot mixture to penetrate all parts of the chain. Now, hang up to cool and then wipe off the superfluous oil. This will put a chain in the best possible condition.

Well, that's an easier job than trying to clean a chain with an oily rag and I bet your method is much better. It sounds good and should put a chain in about as good or better condition than when new."

The Arab's Farewell to His Steed.

CAROLINE E. F. NORTON.

(Concluded.)

Ah! rudely then, unseen by me, some cruel hand may chide,

Till foam wreaths lie, like crested waves, along thy panting side;

And the rich blood that in thee swells, in thy indignant pain,

Till careless eyes which rest on thee may count each starting vein.

Will they ill use thee? If I thought-but no, it cannot be,

Thou art swift, yet easily curbed; so gentle, yet so free:

And yet if haply, when thou'rt gone, my lonely heart should yearn,

Can the hand which casts thee from it now command thee to return?

Return!—Alas, My Arab Steed! What shall thy master do.

When thou, who wert his all of joy, hast vanished from his view?

When the dim distance cheats mine eyes. and through the gathering tears

Thy bright form, for a moment, like the false mirage, appears?

Slow and unmounted shall I roam, with weary step, alone.

Where; with fleet step and joyous bound, thou oft hast borne me on;

And sitting down by that green well, I'll praise and sadly think,

It was here he bowed his glossy neck when last I saw him drink.

When last I saw him drink!-Away! the fevered dream is o'er!

I could not live a day and know that we should meet no more!

tempted me, my beautiful! for

hunger's power is strong— tempted me, my beautiful! But I They have loved too long.

Who said that I had given thee up? Who said that thou wert sold?

'Tis false!—'tis false, My Arab Steed! I fling them back their gold

Thus, thus, I leap upon thy back and scour the distant plains!

Away! Who overtakes us now may claim thee for his pains.

The Nail of Destiny.

For the want of a nail the shoe was lost, For the want of a shoe the horse was lost, For the want of the horse the rider was lost, For the want of the rider the battle was lost, For the want of the battle the kingdom was lost.

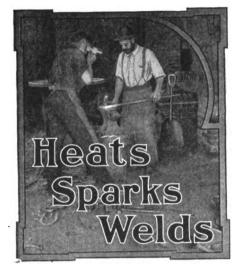
And all for the want of a horseshoe nail.

But this, my child, as you doubtless know, Was a number of hundred years ago,

Brought down to date, the facts are these: The general chooses to ride at least In a new six-cylinder automobile,

And he punctures the tire of his off-front wheel:

So the battle goes bump—not for the lack, But because of a smallish carpet tack. -Puck.



A bellows is better than no blast, but a good blower is best.

John Hogan says: "The horse isn't worth much with poor feet."

While some people save money, others hope to be saved by it.

There's just one thing that keeps success from some men's doors, and that one thing is hard work.

While every smith has need of a shear for cutting iron, he had best give the pricecutter a wide berth.

"Everything comes to the blacksmith who advertises while he works," says Mr. D. J. Dodrill of Colorado.

Some men are continually planning. But unless plans are followed by actions little is accomplished.

What suggestions can you make for the betterment of "Our Journal"? Let us hear from you—we want your help.

'Tis said that the women and bachelors of the United States break, lose and use about three million needles every year.

A goodly number of shop photographs have come in for the special shop issue. If we haven't heard from you send your shop photo today.

"There are just two ways to succeed" said Thornton, "one way is to work at the things that interest you and the other is to take an interest in your work.'

A good all-round blacksmith will find an excellent opportunity awaiting him at Gauder, Pa. Any reader interested kindly address H. D. White of that place.

A recent patent by an Ohio inventor applies to auto lamps and arranges for their turning with the front wheels. By this means the turns are lighted before the car has completed the turn.

Old shingles, when dry, are excellent for starting the fire. Will the shingles on your shop roof serve better as kindling? These new roofing papers are so easily applied that there's no excuse for a leaky roof these

Divide the number of square feet of surface to be painted by 200. This will give you the number of liquid gallons for two coats of paint. No excuse now for not

brightening up the shop. Just measure up how much paint you'll need.

A gigantic barometer was recently erected in Italy to the memory of Evangelista Torricelli, to whom is due the discovery of air pressure. The tube for this mammoth barometer is 37 feet high, and olive oil is used to indicate atmospheric pressure.

Go after the bills while they're young. Like a man, the older a bill the harder to do anything with. Run over the accounts at regular intervals. Then they won't overrun. When a customer is so far behind he can't catch up—then you're behind.

Several competent wagon smiths will find opportunities awaiting them in St. Paul and Minneapolis if they will address the Schurmeier Wagon Company of St. Paul, Minn. This company manufactures trucks and delivery wagons and wants men familiar with this class of work.

Tom's not so shiftless after all. He started to repair that big hole in his shop roof the other day, but had no more than started when a piece of the rotten old roof came down with him. Tom landed on a pile of scrap, fortunately, more scared than hurtand the roof hole is bigger than ever. Tom says he's going to fix it, though—some day.

If it were possible for a man to read all the smithing literature in the world and to listen to lectures by the world's authorities on smithing, what would he profit by it all if he still refused to think on these things? You may read THE AMERICAN BLACK-SMITH from cover to cover every month, but if you do not think about what you read your time will have been wasted. Does "Our Journal" make you think?

Friend Tardy with coat off and sleeves up was hard at work chopping fire wood the other day. When questioned about the strange proceeding he said, "It's my turn. You see we take turns at chopping the wood and it's quite a help for the Missis and girls to have me chop wood for a couple of days every two or three months to help them out." Tom Tardy reasons like one of our modern day lawyers. He seems to think he's doing a favor by chopping wood occasionally.

Put a half bushel of quicklime in a good light barrel, add boiling water enough to cover to a depth of six inches and cover the barrel to keep in the steam. When finished boiling add water to make about the consistency of cream and then add two pounds of sulphate of zinc and one pound of common salt. Now add water enough to make the mixture spread easily with a paint brush, and after stirring thoroughly apply to the interior shop walls. It will brighten the shop and make it more inviting.

"We repair anything from a stewpan to an airship"; is the slogan adopted by the J. F. Thompson Repair Company, Oakland, California, who have recently put on the road the most unique repair shop known to the automobile trade. A forty-horsepower Rambler has been equipped with a platform and enclosed body on which this repair shop is located. In the car is a lathe, two grinding and polishing wheels, an emery wheel, a key cutting machine, a glass rack. tool cabinets and benches and a complete

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plumber's outfit. The machinery is run by a three horsepower motor cycle engine. The combined weight is 4220 pounds. In this car the proprietors travel about Oakland, San Francisco and vicinity doing work in their line.

A general smith we know, who also takes care of automobiles, has the following printed on the back of his business card:

"Most auto troubles are tire troubles, Therefore—

Never jam on the brakes.

Never run on soft tires.

Never run a tire after the canvas shows

have it vulcanized.

Never rim-cut a shoe—extra inner tubes are cheaper.

Never buy tires at bargain sales—the best are none too good.

Never overheat a tire by rapid running—cool it off with cold water.

Never allow oil or grease to remain on a tire.

Never put a car in storage for any length of time on inflated tires—jack up the car and allow air to escape.

American Association of Blacksmiths and Horseshoers.

Do you think you will get more work from your customers because you do your work cheaper? Suppose you are getting twenty-five cents more per set, could you give your customers better shoes? A set of shoes which you put on for a dollar or less will wear every bit as long as a set for which you get one dollar and twenty-five cents, and I do not think that anyone would drive his horse barefoot just because it costs twenty-five cents more to get it shod.

Are you afraid your trade will leave you if you raise your prices? It will do them little good if your prices are raised through an organization. If the prices in your county are made uniform your skill will hold your trade. A good mechanic will always get his share of work at fair prices. You may think that you will lose some of your trade, but your customers will not leave you if they have to pay the same prices elsewhere. A county organization will bring these conditions about.

Would you rather have four dollars for shoeing four horses or five dollars for the same work? Just figure out how many horses there are in your vicinity—how many times they are shod, and then figure out how many thousands of dollars it would mean to the shoer if prices were raised but five cents per shoe. You can do your part in bringing about such a condition.

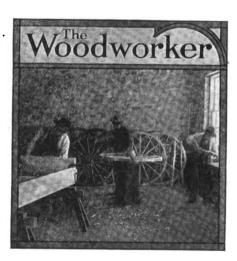
Now, suppose on the other hand, that you did lose, say, as much as one quarter of your trade (which is not at all likely), you would still get the same money for the work, and save on time, nails, shoes and coal. Just figure out the matter on that plan. You will still be ahead of the game, even if you lost one quarter of your trade.

But that is not at all likely to happen in a county where all prices are uniform, and they can be made uniform through organization, through the cooperation of the shop owners. If you are still working for the same prices that you received one, two or three years ago you owe it to yourself, to your family and to the craft to get prices more in keeping with present costs. You will admit that costs in all quarters, in blacksmith supplies as well as living expenses, have increased considerably in the last few years.

It has been shown and absolutely proven that a successful working association can be formed which absolutely prevents price-cutting. And such an association in your county will mean dollars in the pockets of every single member. It is to your interest, to the interests of your neighbor and to the interest of every other smith in your county to support and to join in a coöperative effort to better prices and craft conditions.

If you are interested in the securing of better prices for your work, if you want to abolish the many abuses to which every craftsman is subjected, ask for my easy plans for forming branch associations. Address P. O. Box 974, Buffalo, N. Y., and a postal card will do. May I receive your request today?

THE SECRETARY.



Proposed Grading for Hickory Vehicle Wood Stock.

These rules have been approved by those using a large percentage of hickory dimension stock, and are entirely in accordance with the advice of the Forest Service of the Department of Agriculture.

The rules are as follows:

Spokes.

Based upon the strength of hickory woodstock as determined by the mechanical tests of the Forest Service of the United States Government, in which it was found that red or red and white mixed hickory of equal dry weight and having similar defects was of the same strength as white hickory, and should be graded with reference to its quality, regardless of its color.

These tests having been approved and accepted by the manufacturers of vehicle wheel woodstock and the manufacturers of vehicle wheels it has been determined that there shall be five grades, to be known as A, B, C, D and E, respectively.

The various recommendations for grades which are herewith made were prepared upon consultation with the representatives ol all vehicle interests actively engaged in the production of hickory vehicle woodstock, and the advice of a representative of the forest service of the United States Department of Agriculture, and a close following of the recommendations issued by the Forest Service of the United States Department of Agriculture, in circular No. 142, which is a compilation of a large number of mechanical tests made at a government experimental station of the forest service through the co-operation of the National Hickory Association.

The main recommendations in this circular are as follows:

"Defects in spokes commonly include iron streaks, bird pecks, cross grain, knots and worm holes. A spoke containing a worm hole is dangerous—as it is impossible to tell to what an extent the spoke has been bored on the inside.

"Iron streaks are supposed to be caused by the infiltration of foreign coloring matter through bird pecks. Iron streaks and bird pecks, when they show only slightly, apparently do not affect the mechanical qualities of a spoke. They are not generally found in the heaviest spokes, but among those of medium or light weight.

"Spokes failing from cross grain generally break into two pieces.

"Defects, such as knots, have greater weakening effect when near the center than when near the ends.

"The spoke tests definitely show three things: First, that the present system of grading buggy spokes does not correspond to their strength and toughness; second, that the factor denoting the strength and toughness of clear spokes varies directly with the weight; third, that red, white or mixed spokes of equal weight have practically the same resilience factor."

Grading Suggestions.

"The term 'second growth' and 'forest growth' are so loosely applied in the designation of grades that they are confusing and might well be discontiinued. These terms, as used by the trade, distinguish between good and poor wood and disregard the true meaning of the words.

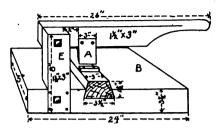
"In order to use the terms in their correct sense the particular species and conditions of growth would have to be known for each piece of material. Commercially, this is impossible. In reality a large per cent of the stock which is classed as 'second growth' is forest grown stock of good quality.

"As changes in the forest take place, due to lumbering and new growth, it may be

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asked at what point does the wood cease to be 'forest growth' and become 'second growth?'

growth?'
"The manufacturer cannot definitely
answer this question and cannot tell but



A WEDGE CUTTER BASILY MADE

that it is possible to secure both kinds of stock from the same tree. The term 'black hickory' is also confusing when used to designate a grade, because it is the accepted common name for certain species. "There is much discrimination in the

"There is much discrimination in the trade against defects, such as knots and checks, but little is said about cross grain. The tests have continually shown that in such material as spokes, that cross grain is one of the most serious defects. Defects that will be removed in finishing should not be considered defects by the inspector. Clauses in grading rules, such as 'clear of any defects impairing the strength,' are too indefinite."

The representatives of the vehicle woodstock trade above mentioned recognize the importance of the recommendations from the United States government, and these grading rules are prepared to the best of their ability, in accordance with the above recommendations and which at the same time could be commercially applied to their business.

their business.

"The most useful result of the vehicle wood investigation is the placing of red hickory in its proper class. The real worth of red hickory, as shown by the test and not by the color, is a point that should not be lost sight of in grading hickory stock."

DEFINITION OF TERMS.

Very Dense Growth.

A very dense growth is a growth in which the non-porous part of the annular ring covers over three quarters of the area of the annular ring, and the remaining one quarter contains a small number of pores,

Dense Growth.

A dense growth is one in which the nonporous portion of the annular ring occupies at least one half of the annular ring, and is slightly more porous than the very dense growth, and accordingly that timber which contains a less per cent of non-porous growth and a larger per cent of porous growth is representative of a lower grade of timber.

Blemishes.

A blemish is that which, while marring the appearance of the spoke, does not affect the strength of the timber.

(a) Stains. A stain is a discoloration caused by improper care, or handling, by improper piling, by being left in the weather or on the ground during the warm and wet seasons.

(b) Iron Streaks. An iron streak is supposed to be caused by the infiltration of foreign coloring matter through bird pecks, but does not affect the mechanical quality of the spoke.

Bird Pecks.

A bird peck is a slight defect caused by the bird pecking a hole in and through the bark of the tree into which there settles foreign substances that discolor the timber.

Bastard Spoke.

A bastard spoke is one in which the growth or annular rings do not run across the narrow way of the spoke.

Cross Grain.

A cross-grain spoke is a spoke in which the growth or grain of the timber does not run parallel with the center line of the spoke.

Sound Knot.

A sound knot is one in which the wood is as solid as the wood surrounding the knot.

Short Curve or Dip in the Grain or Growth.

A short curve or dip in the grain or growth is a curvative or deflection caused by a knot.

Snari

A snarl is a twisted grain or growth in the wood.

Grub Holes.

A grub hole is a hole about one quarter inch in diameter caused by a grub worm boring a hole, usually lengthwise of the growth of the timber.

Powder Post.

A powder post piece of hickory timber is caused by a very small worm that continues to work in the timber after it has been cut, seasoned and even manufactured into the finished vehicle. While his work does not frequently appear on the outside, the inside may be entirely reduced to powder—hence the term powder post.

Worm Holes.

A worm hole is a clean, open hole about one-sixteenth inch in diameter, and is

SPOKE RULES.

"A" Grade.

"A" grade is the first and highest grade. Of all white timber of very dense growth; must be straight grain and free from streaks, stains and all defects.

"B" Grade.

"B" grade is the second grade and must be practically straight grain, of dense growth. Of all white, and of red, part red and part white timber. The red or part red and part white must be fully equal to or better in quality than the white in this grade.

All spokes in this grade must be free from all defects and no spokes shall be more than

one quarter bastard.

"C" Grade.

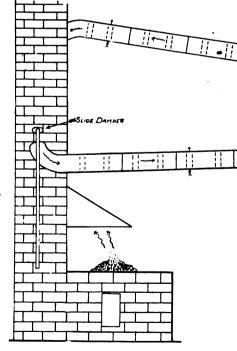
"C' grade is the third grade and must be of medium quality of either white, red or white and red mixed timber. This grade will admit of spokes of good quality timber not admitted in the "A' and "B' grades on account of cross grain and all slight blemishes, such as iron streaks and stains, but that are equal in strength to a clear spoke of this grade.

Cross Grain. The grain shall not run in the length of the spoke at any place at a greater angle than one inch in eighteen.

Short curves or dips in the grain not to be included in this grade.

"D" Grade.

"D' grade is the fourth grade. The timber in this grade, although clear and straight grain, of white or red, or white and red mixed, is of a weight and quality not admitted in the higher grades. Also, spokes of a high quality of timber, equal in strength with the straight grain spokes in this grade, but with blemishes such as iron streaks and



UTILIZING WASTE HEAT IN THE SMITH SHOP

easily visible, caused by a bug usually working in partly seasoned timber.

Sun Check

A sun check is a season check caused in seasoning and usually takes place in the best quality of timber. In some instances these checks are so very small that they do not impair the use or strength of the timber and be used at least in the lowest grade.

stains, and defects such as knots and bird pecks that are sound; also cross grain, provided the grain shall not run in the length of the spoke at any place at a greater angle than one inch in twelve. Short curves or dips in the grain shall not extend more than one third of the width or thickness of the spoke.

"E" Grade.

"E" grade is the fifth and lowest grade, consisting of spokes that can be used, but such as are not admitted in the higher grades on account of quality of timber and defects. Spokes with defects such as powder-post, worm-eaten timber and with open defects, such as grub holes, checks, splits, bird pecks and otherwise unsound, and spokes with defects such as knots, large bird pecks or snarls in the head, throat and rim end, and very brash timber such as has practically no fiber and strength will not be admitted in this grade. Spokes with alight season checks may be used in wheels of this grade.

RIMS.

Note: The same basings upon strength, tests, recommendations, defects grading suggestions, definitions of terms and rules, as applied to spokes, are applicable to rims as well.

A Handy Tool for Making Wedges.

ED. DIETRICH.

Select a piece of hard hickory. twenty-four by three and a half by five inches. About four iuches from the back end notch in one and a half inch for upright piece E, which should be of good hickory (as also should be the handle). Take a piece of steel one and a half by three by one fourth inches: I used a piece of wagon spring; bevel off one side and grind sharp. Now notch into the handle for the depth of the thickness of the knife A, letting about seven eighths of an inch protrude below handle. Bolt on as at A with the flat side facing you. Now cut a dovetail across the block B, and cut your chopping block to drive into this groove, which must be directly under the knife. Bolt the handle onto the upright piece with a f-inch bolt and draw tight enough to let the handle work up and down fairly easy. Now let the handle drop down until the edge of the knife rests on top of the dovetailed block and tack a small strip, about a quarter of an inch thick on top of the block right up against the knife. This is for a backing to hold the pieces to be made into wedges from slipping away from the knife when you bear down on the lever. When this block, which should also be of very hard material, gets a groove worn out from long use, drive it over a little and tack another strip up against the knife and so on, but this will not have to be done very often. Either bolt or clamp onto bench in a handy place, and you will find this to be a great improvement over the old way of chopping or shaving out wedges, as one wedge can be made at each stroke of the knife.

Utilizing Waste Heat in the Smith Shop.

D. FOSTER HALL.

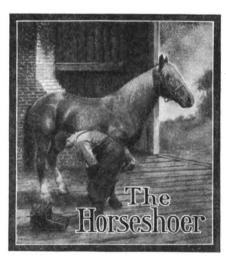
The accompanying engraving, page 184, shows my idea of saving a part of the waste heat in a blacksmith shop. This device consists of an eight-inch stovepipe, with two 2-inch flues in each section, put up so the flues will be vertical, so that the air will circulate through them freely. This pipe is connected to the chimney just above where the heat and smoke from forge enters. Above this is a sliding damper



A THREE-LEGGED COLT

The animal is 20 months old. Its mother is a Morgan and father an imported Percheron. The knee and pastern of the one leg are double.

operated by a lever so arranged that the smith can control the heat as he chooses. The pipe should extend sideways from the forge chimney about three feet, or far enough to clear any large tire or other large work. It should then turn at right angles out into the shop space at a slight upward angle any length to suit the size of shop or floor space. It should then run horizontally about two feet and return to the chimney at an upward angle of about ten degrees or more and enter the chimney at the opposite side. By this system of heating we have a great heating surface and a good circulation of air through the flues, which is important in heating.



A Talk on Foot Anatomy and Shoeing.

A. F. LIBBY.

The outer shell of the foot is a combination of the hair and outer skin.

The inner skin folds at the top of the hoof, forming the coronary cushion. It then forms in layers what is called the sensitive laminæ, with its inner side attached to the pedal bone. Next come the lateral cartilages of the foot. These act as a spring over the sensitive frog and are fastened to the wings of the foot bone. It is this part of the foot which under inflammation changes in structure and becomes bone. Be neath this we have the sensitive frog which secretes the outer frog.

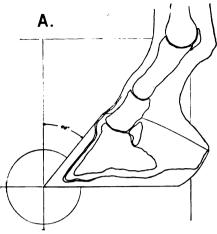
The flexor tendons pass down the back of the leg with the perforated branches and stop at the sides and top of the lower pastern. The perforans passes through the outer one and attaches itself to the bottom of the pedal bone.

In the front of the foot we have the extensor pedis tendon. This fastened to the top of the pedal bone at a point opposite to the perforans tendon. On the sides of the pasterns we have the plantor nerve arteries and veins. These branch as they pass downward to the various parts. One point is this: Although there are arteries and veins enough at the coronet to grow the outer shell of the foot the larger part of the blood passes through the pedal bone, coming out around the toe in small arteries and branching upward leaving the nourishment to that part of the foot. We are all familiar with the bones of the foot and their

If in normal form, we have little trouble with such feet, but if from inflammation of the tendons or from malformation of the pasterns the articulation is changed we give the proper ground bearing to the foot by different forms of shoes. For a horse that reaches out and lingers, that is, does not recover quickly, I use the rolling toe. We have the long roll and the spare one, each to be used as to the ground bearing of the foot. In no case should the roll extend more than one half the distance from point of frog to point of toe.

If, on the contrary, the horse's action is high and choppy, I use the toe weight shoe with nearly all the weight in front of the center of gravity. The common bar shoe I use on a good foot in most cases. It keeps it so by keeping the frog in place. If the horse is knee sprung or knuckled in the pasterns I extend side calks back of the shoe on the heels.

For the horse that forges I use a good stiff shoe on the front part and a shoe raised on the outside behind,



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OUTLINE OF A NORMAL FOOT

either forging a shoe with a rim on the outside or place a long side calk on the outside heel. Set the toe calk hard on outside of toe.

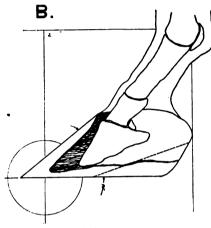
For the horse that folds and strikes the elbow use a heel weight shoe. Weight at the heels keeps them from being lifted as high but does not change the stride to any extent.

For bruised heels, quittors, corns and in some cases of quarter cracks where the quarters are driven up I find a three-quarter shoe to be of benefit. With this shoe the diseased part gets no ground bearing and the quarter settles to its proper place, in most cases improving the foot.

For the horse that paddles or fans, I use a short spur at outside point of toe, but if extended very far it would strain the ligaments at the fetlock. The horse that strikes the splint bones or the knee, I use a shoe which extends beyond the foot from one quarter to one half inch on the outside. If he travels hard in a thin shoe use one weighted at outside point of toe and inside quarter, either one of these shoes will be found of benefit.

A Properly Balanced Horse.

It is useless to balance the foot of the horse if the body is out of balance. The body is thrown out of balance by being checked too high, or the reverse



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SHOULD BE RESTORED TO "A"

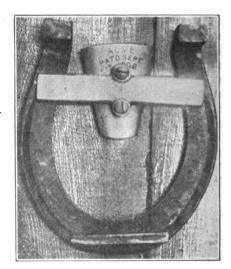
by having the head pulled down out of line. The center of gravity in the body of the American horse is said to be the fourteenth dorsal vertebræ. One foot must fall on a line with this point when the horse is in motion. A horse should be properly harnessed so that his

body is balanced, if you expect perfect action. If not properly checked, the horse that pulls will be pulled down out of line. Some horse's pull equals from 150 to 300 pounds. If the vertebræ of the neck is curved, you strain the elastic ligament, or at least put it out of use. This ligament extends from the occipital bone, at the top of the head, to the vertebræ of the back, and takes the strain from the muscles of the neck.

An Attachment for Horseshoes.

HORACE D. HOVIS.

This attachment is to be applied to common horseshoes, for the prevention of lameness in horses' feet and limbs while at work on hard city pavements and country roads. The main points of advantage are the ease of adjustment of frog-pressure in order to give natural action to the foot, and the restoring of the natural action of the different parts of the foot. It also gives a natural movement to the limbs and body of



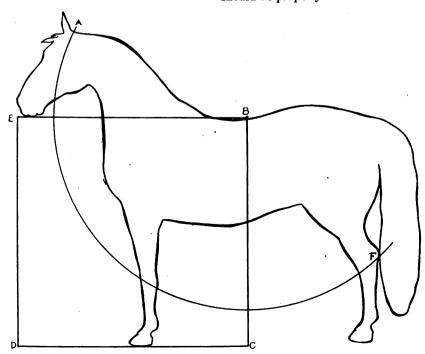
AN ATTACHMENT FOR HORSESHOES

the horse, preventing undue pressure on the heels and rear portion of the foot, which are most liable to suffer from severe blows while traveling hard pavements. It also serves to prevent the breaking down of the sole and central structures of the foot, thus preventing flat feet, corns and bruises to the sole. The bar is riveted or fastened to the shoe crosswise.

A Home-Made Forge.

A. R. SKERRITT.

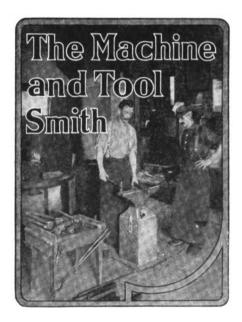
The accompanying drawing shows a forge which I have just made in my shop. The frame is of angle steel, one and a half by three sixteenths,



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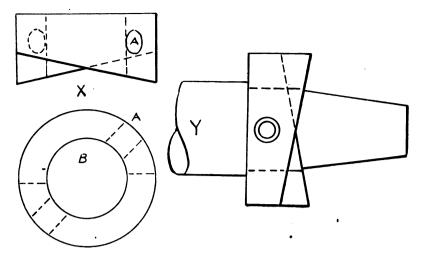
THE BODY MUST BE CORRECTLY BALANCED

except the top front rail, which is one and three fourths by one fourth. There are five joists in the bottom which do not appear in the engraving. It is filled with concrete. The sides are boarded up before filling, and a floor underneath the joist. When the concrete had set I removed all boards. The coal box is three feet long, twelve inches wide and eight inches deep. The concrete is eleven inches thick; the forge twenty-seven inches high and four feet eight inches square. My slack tub fits half way under the forge at the right-hand side. This forge is fitted for a Royal blower. The iron rest is easily made and not expensive. Three bags of cement and about one hundred pounds of steel did the job and I am very much pleased with it. Several smiths have seen it and call it fine. I never saw anything like this before.



Saved from the Scrap Heap.

There is perhaps no other subject that allows a wider field for experimenting than the hardening of steel. We are constantly digging up new kinks of all kinds brought about by the ever recurring question of econo-As an instance we recite the following: A short time ago a large shipment of drop forgings was received at our factory. These forgings were about as shown in the accompanying engraving at X, and are known as ratchet collars. They are driven on the end of the crank shaft after being hardened and are then pinned by means of a pin through hole A. The end of the crank is tapered, while close up to the shoulder is a bearing for the collar. Naturally, the collar must



SAVED FROM THE SCRAP HEAP

fit good. At Y is shown the shaft end with ratchet collar in place.

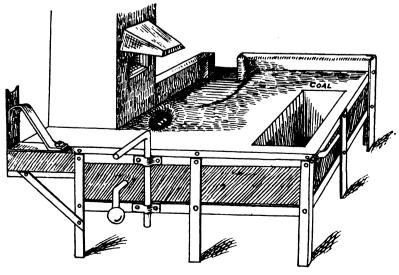
As the collar is reamed inside to measure one inch, and its bearing on the shaft is turned to one inch, one would naturally suppose that in hardening the collar would shrink to a tight fit. Some collars did, but others did not. There were not more than ten per cent that did. As a loose fit would not do, we tried heating and cooling, but this did not shrink them.

We had about a thousand of those collars all ready drilled and reamed and it looked very much as though they would have to be scrapped. This we did not do, however,—we saved every one. We figured that the operator in drop forging these collars hammered them very cold under a very heavy hammer, thus closing the grain of the metal to such a degree that when reheating to harden, the grain would not close down as before heating. This was determined by the fact that nearly all collars were larger after hardening than before.

How we saved these forgings from the scrap pile and still got a perfect job with every one will, no doubt, interest readers. The thing to do was to loosen up the grain of the metal and then to shrink the collars to a drive fit. This we did by placing all the undrilled forgings in a large furnace and then bringing them to a bright red. They were then placed where they would cool slowly. Then we drilled and reamed them as before, and when they were reheated and hardened the fit was just right.

The pieces that have been drilled and reamed we are going to heat and swage enough to make the hole one sixty-fourth of an inch smaller. Then we will anneal them similar to those that were not drilled.

Most readers no doubt, know that in most cases where holes have been reamed slightly too large the pieces are nickle plated, thereby getting the necessary fit. This is, however, a bothersome practice, and also expensive. The foregoing method will save



A HOME-MADE FORGE BUILT OF CEMENT

this time and trouble, and also save much valuable material that would otherwise be useless.

Another Method of Repairing Flues.

M. SUSSKY.

I see quite a little in "Our Journal" about flue welding, and will say I used to weld flues, but I have quit and substituted another way of mending them and will tell my brothers about it. I take out the flue at the manhole, if there is a man hole, if there isn't I make one. I take the flue to my pipe vise and cut it off with a pipe cutter. Then I file off the edge that is made by cutting with the pipe cutter and file the flue A clean and bright. I now measure where I want to put the flue and then take another piece of flue C, the same size, and cut off a piece the length I want to make my flue and file that smooth. Then I make a band of iron B, one eighth by two inches, to fit the flue, and drive it on the flue and drill about three %-inch holes and thread with a quarterinch tap and screw my rivets in. I then file smooth on the inside, so flue cleaner will go through. Then I drive a piece of flue in the band and rivet it the same way. Now, I put some brass and borax in the flue and braze it, scrape all the clinkers out while it is hot and then I stand the flue on end and pour water in it. If it leaks out I take a calking chisel and calk

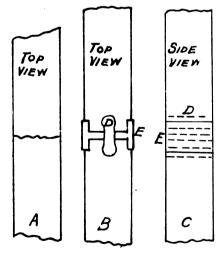


FIG. 1.—PREPARATION OF THE BREAK

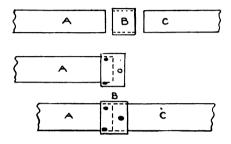
the edge of the band. Then the end of the flue is heated and stuck in slacked lime until it gets cold. It is then put back in the boiler. I have managed a great many flues this way and I have the first one to leak yet. I have never seen my way of

mending flues printed, but I think it is the best and easiest way.

Welding Broken Locomotive Frames.

ETHAN VIALL.

There are many ways of welding broken or cracked locomotive frames without dismantling the engine, the heating being done in a majority of cases with crude-oil burners, though thermit is used in some shops. In



ANOTHER METHOD OF REPAIRING FLUES

preparing the break for welding, some jack the frame apart far enough to insert a plate of wrought iron about an inch thick between the broken ends and then butt weld, while others use wedges or laps of various kinds, the whole idea being to make the broken place as strong as possible without altering the proper length or alignment of the frame. I have known of a few cases where a plain butt-weld was made with no metal inserted to make up for the inevitable shortening. and with very satisfactory results. However, as a rule this practice is not recommended.

In all I have probably seen a dozen different methods and have read of as many more, but nowhere have I seen a way of preparing a break for welding that I liked so well, as at the Big Four Shops at Urbana, Ill. Crude oil is used for fuel and a furnace is built up around the break in much the usual way. The work that I saw done in these shops was under the supervision of General Foreman A. F. Bradford, and in direct charge of Gang Boss A. N. Hoag. Permission to take the photographs was given me by Master Mechanic J. A. Gibson.

Referring to Fig. 1, this method of preparing the break will be seen at a glance. In the cut, A represents a view of the broken frame from above. The frame is jacked apart, the ends trimmed and fitted, as at B; C being a side view. The rounded ends of D are cut to a 1\frac{3}{4}-inch circle, the connecting web is about an inch and a half thick, and the entire piece is about

four inches long and extends entirely through the side bar. The T-shaped pieces E, are about an inch thick both ways and the same length as piece D. These T-pieces are set in between the broken ends, which have been smoothed up, so that the tongue just touches the sides of D, and the crosspiece is let into the metal, as shown. All three of these set-in pieces are wrought iron.

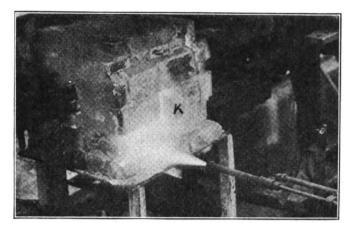
The beauty of this method, besides its manifest strength, is the ease with which the recessing is done. Two holes are drilled through the frame for the ends of D. and the rest is easily chipped out, air being used all around, except to finish. After this is done the furnace is built up out of fire brick and fire clay, and with an oil burner going from both sides at once the parts are soon brought to a welding heat, when the jacks are eased up, the frame brought back to the right length and the weld finished with rams after the furnace is knocked awav.

When the frame is just cracked and not broken clear through it is repaired as shown in Fig. 2. In this job the piece H does not extend through the frame, but is set in for about an inch and one half and about half an inch is left sticking out. One of these is set in on each side of the frame sidebar. A black line has been drawn on the picture to show the crack in the corner close to the piece H, but on the frame itself the crack was barely visible.



FIG. 2.—REPAIRING A CRACKED FRAME

Figure 3 shows how the furnace was built up around this break, and the oil burners in full blast. A burner is going on the opposite side from the one shown, though it cannot be seen. A brick K is loosely set in so that when the right heat is obtained it may



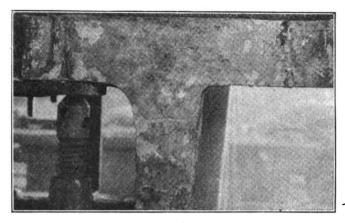


FIG. 3.—THE FURNACE IS OF FIRE BRICK

FIG. 4.—THE FRAME AFTER WELDING

be removed and a ram used on piece H. It also affords a ready means of inspecting the progress of the heat. As this brick K, is directly opposite H one will see that the flame does not play straight on the break, it being deflected by bricks placed steplike. This reduces the tendency of the flame to scale the iron from unconsumed oxygen.

Figure 4 shows the weld as it looked after the furnace had been knocked away and while the iron was still red.

The burner used for this work is shown in detail in Fig. 5, and the way the oil tank is piped is shown in Fig. 6. In this the pressure is supplied to the oil tank through a T set into the air line that furnishes blast for the burner. It is the intention to keep the air pressure at about ninety-five or one hundred pounds, but as a matter of fact the pressure is usually considerably below that.

The Heat Treatment of Steel.

From the time immemorial when iron in its most crude form was introduced into the manufacturing and

commercial field it has been a well-known and accepted fact that heat with its varying degrees of intensity has a direct action on both the

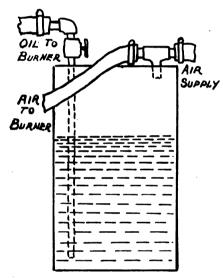


FIG. 6.—METHOD OF PIPING THROUGH OIL TANK

physical and chemical properties of the metal; and as a direct result the entire structure of the iron is altered. By

altering or changing the method of application of the heat any desired structure of the metal, either steel or cast iron, may be obtained. In spite of the fact that the truth of the above exposition was generally acknowledged very little if any use was made of it; but as science developed competition grew keener and keener, and the general cry in the manufacturing world became "reduced cost and greater output." To balance the effect of increased power and consequently larger machines the working strength of the cutting tool together with the working stress of the machine's members had to be greatly increased; and during the past decade the heat treatment has done more than its share in the work of accomplishing the desired results.

Therefore, the Worcester Polytechnic Institute has, during the past year, through its Department of Mechanical Engineering, designed, constructed and equipped a modern plant devoted exclusively to the heat treatment of steel. The more important operations

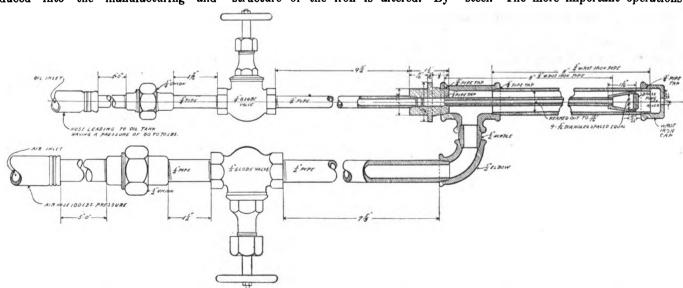


FIG. 5 .- DETAIL AND PARTIAL SECTIONAL VIEW OF THE BURNER WITH ALL DIMENSIONS AND INSTRUCTIONS FOR MAKING

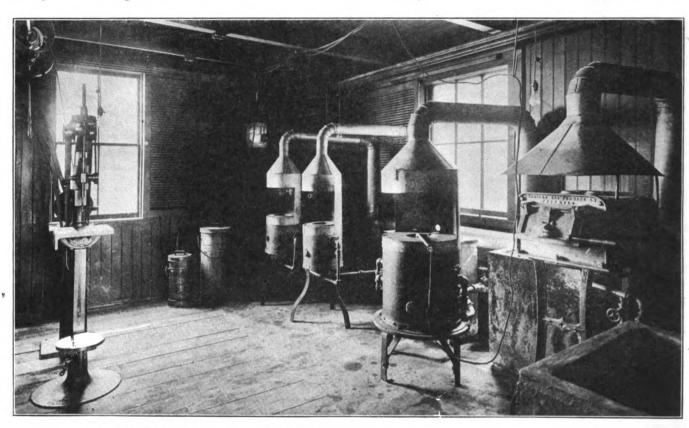
to be included under the above general head are hardening, annealing, tempering and casehardening. From the very general description given in the following paragraphs of the equipment and facilities of this plant it will be easily seen that all grades of steel from the fifteen-point carbon steel to the high-speed alloy air and water-hardening steel may be conveniently and efficiently handled and treated.

The plant referred to consists of a good-sized room, in the design of which the comfort of the operator was well provided for. The temperature and ventilation of the room are controlled both by a fan and large windows which

metrically on the right side of the room. For convenience and simplicity we will designate these furnaces by the letters A. B. C and D. in the following description. Furnace A is built on the principle of the muffle furnace and is of the box type, constructed by the American Gas Furnace Company, and will readily heat a block of steel eight by four by fourteen inches. A temperature of from 2000° to 2100° F. may readily be obtained by means of this heater, which is used or employed to heat such work as requires an even heat and which would be destroyed by oxidation and the decarbonizing action of the air. Good examples of

accompanying "cracks." Furnace C is of the same general design as Furnace B, with the exception that this heater is made use of in connection with the lead bath, and as the lead melts at much lower temperature this furnace is used where a lower temperature than the "chloride solution" is desired, as, for example, carbon alloy steel.

Furnace D, although of the same general form, is devoted to an entirely different operation, namely oil tempering. In this furnace is used either linseed or machine oil; and this heater is brought into action when the desired range of temperature is between the limits of 300° and 630°.F. The fuel used



THE MODERN PLANT AT WORCESTER POLYTECHNIC INSTITUTE FOR THE HEAT TREATMENT OF STEEL

admit subdued natural light, but exclude the direct sunlight which is so undesirable in this kind of work. These windows are provided with shutters so that the natural light may be excluded and artificial illumination used. The first impression of the visitor to this room is that of a "dungeon," due to the fact that the walls and ceiling are painted a "dead black" which color prevents any absorption of the various colored rays when the operator is experimenting on "color work."

After his first impression has left the visitor and he has become accustomed to the light the next thing that catches his eye is the row of various-shaped furnaces placed symthis type of work are reamers, mandrels, taps and drills.

Furnace B, known as the "barium chloride heater," is circular in form and lined with firebrick. The chloride solution is heated in a crucible built of fire resisting material. This furnace is of sufficient size to accommodate the ordinary run of tools and is employed to heat such grades of steel as require a rather high temperature, for highspeed steels and at the same time be well protected in heating. This form of heat treatment is well adapted to such types and forms of tools as are liable to uneven heating and consequently an unbalanced distribution of the shrinkage strains with the in all of these furnaces is the ordinary city gas, due to its convenience and accessibility, but a shift could be made and oil fuel employed if so desired by the operator. As will be seen from the engraving, all the furnaces are provided with hoods of convenient form and connected with an exhaust line so that all poisonous fumes and gases such as lead, cyanide, barium chloride, etc., may be eliminated from the atmosphere.

At various and convenient positions about the plant are to be found tanks, rectangular in shape and of convenient size, containing water and brine of varying densities. All the other baths, for example, the various grades of

oil and other cooling baths, are kept in cylindrical, covered galvanized iron tanks. In order to properly care for and treat the air-hardening steels an air jet is provided with a pressure of about two pounds.

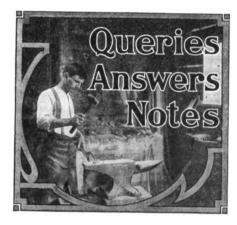
The one feature which removes this plant from the class of the ordinary manufacturing establishment and places it in the rank of those of scientific research and investigation is its complete set of measuring instruments, including the Bristol and Le Chatelier pryometers and thermometers, covering a range of temperature between the limits of naught and 296° F. On one of the walls of the room is to be found the Bristol pyrometer, which is of the thermo-electric type and consists of a permanent magnet moving coil type of galvanometer. The scale is graduated to read direct in degrees. Leads from the instrument extend over the entire room, so that it is a matter of a few seconds only to connect with the thermo-couple and obtain any desired temperature. If any question as to the accuracy of the instrument, or the action of gravity on its oscillating parts is advanced, a Le Chatelier pyrometer operating on the same principle, but having a vertical support, may be brought into action and the first readings verified.

It might be stated in closing this sketch that in order to facilitate the preparation of test specimens and other work a "Washburn" drill and also a grinder are provided and placed on the opposite side of the room. The work in this new plant is not confined to experimental work alone, because the range of equipment provides all the requisites necessary for performing outside commercial work for those who have not the facilities to properly treat their own tools.

This heat treatment room offers excellent opportunities for those taking the Mechanical Engineering course to become thoroughly conversant with the most approved and up-to-date methods of heat treating steel, and with this in mind the attention of the student is frequently called to both the scientific and also the economic features of the work, and during the senior year this work has its position in the curriculum of the school.

Do You Know

that this number of "Our Journal" contains 26 reading or editorial pages instead of 24? Tell your neighbor—show him this copy and then get his order for a year's trial.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants a Hub Borer.—Who can tell me where I can get a good hub-boring machine that is not too high in price?

H. BLEIBER, California.

Placing Rub Irons.—I am a wagon blacksmith and would like to know how to figure out where to place a rub iron on a threespring wagon without putting the gear together. Louis Worasek, Missouri.

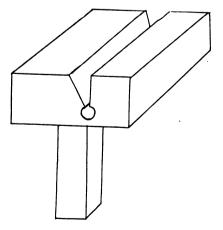
Can you Figure It?—Given a ball 12 inches in diameter, what size square hole must I mortise through the center to contain one third of the ball's contents?

HENRY BERGE, Pennsylvania.

Wants a Tire Holder.—Will some brother smith kindly give me an idea of how to make a tire holder for use when alone at the anvil, welding or punching holes? If I could get a single idea of how to make one I would consider it of great value.

Louis Lau, Illinois.

Treating a Lame Mule.—I have a mule that is lame on one fore foot. He has been lame about two months; the foot seems to be smaller at the bottom than it is at the



A SWAGE FOR TOE CALKS

hair of the hoof, as if it might be a narrow heel. I would like to know what to do for it.

A. B. Wood, Tennessee.

Likes the Auto Department.—I would like to see an article in "Our Journal" in reference to the Maxwell Automobile. I would

like to know how to care for the engine. I am very much pleased with the auto articles and study them all. I have just bought a Maxwell car. Elwood Whaley, Maryland.

The Jig Saw Problem.—In reply to the inquiry of Mr. J.W. Summs, who wants to know how to rig the spring on his jig saw, I would say put a bolt through tthe rear end with a turn-buckle in the center like on a buck saw, which is very simply and easily adjusted when changing saws. C. W. METCALF, Iowa.

Says Success to Journal.—I like your paper fine. I have only been running a shop about two years and lay my success to The American Blacksmith. I have conquered everything I have tried so far. If I get balled up on anything I get my American Blacksmiths out. I always find a remedy. A. E. Andrews, Oklahoma.

They Like It in Mississippi.—I couldn't run my business without your paper. It is as indispensable as the best tools in my shop. I advise all blacksmiths to take it. A good paper means good work; good work, good customers; good customers, good pay; good pay, a good business; and a good business is what we all need.

O. T. Jones, Mississippi.

Dressing Old Rasps.—I will tell you how I dress and temper old rasps that have been worn out. First, I heat the rasp and draw the temper. Then with a three-cornered file I dress the teeth sharp, the same as in the case of a saw. When I have the teeth sharp I heat again and coat with cyanide of potassium, plunge in water till cool and it will be as good as new.

J. F. Lohr, Ohio.

Fast Shoeing.—I saw in the March number an item written by Mr. W. M. Deremer, of Ohio, in which he said he had driven one hundred and thirty-six shoes from 6:30 to 4 o'clock. That is about eight and one half working hours. I would like to say that I pity the horses that he shod and the man that got the work done. Better do less and do it well and at right prices.

B. F. Watters, Iowa.

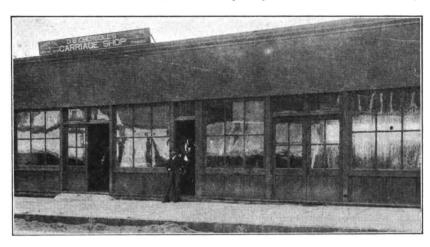
A Swage for Toe Calks.—The accompanying engraving shows a swage used for welding sharp toe calks. If made in this way it will always keep clean and present smooth, clean surfaces to the work. The swage may be made in the ordinary way and then drill a quarter inch hole through it as shown. The opening at the bottom of the slot should be about one sixteenth of an inch wide. F. J. Kitowski, Minnesota.

On Interfering Horses.—I want to hear more from W. Chambers. Let him know that someone takes notice of his letters. In reply to Daniel Johnson, regarding interfering horses, I would say it is no trouble to stop them. I want to see the foot; if I think that the horse toes in I put on a light steel shoe and put it on to fit the foot. You must prepare the foot and do it right. There are a lot of shoers that pull a shoe off and then nail one right back on.

I. A. C. TAYLOR, Massachusetts.

Shoeing the Ankle Hitter.—In regard to A. R. Pace, of Tennessee, on ankle hitting, will say that I would not like to hear of an Ohio smith shoeing an ankle hitter any other way than level. As a speed horse in this state must have first a level foot and a level head; third, a level headed driver as well as a level-headed smith. My way

is to shoe every horse as level as can be done, and experience should teach you where to place shoe. If placed right you will have no trouble. Joseph M. Jones, Ohio, Mole tire shrinker, an Advance drill, a Goodyear Rubber tire machine and Little Giant dies. My work consists mostly of carriage repairing. I make a few new spring



BROTHER D. B. EBERSOLE'S NEBRASKA CARRIAGE SHOP

A Question on Water Power.—Will some of the skilled craftsmen give me some advice? I want to build an over-shot water wheel 14 feet in diameter and 8 feet wide. Tell me the best way to gear it, whether from the shaft or to have segments, or if segments are used how far from the center of shaft should the segments be put on so I can get the most power with the least water? How wide should the buckets be and how deep? An answer to this will be received with many thanks.

GEORGE B. WOOD, New York.

An Arkansas Shop.—I cannot do without The American Blacksmith. I take very much interest in reading the letters and discussions. I am running a small shop here in Arkansas. I have a 3 horsepower I. H. C. Engine, a twenty-inch rip and cut off, a wood turning lathe, a Western Chief Drill for hand or power, one No. 2 Burnham drill press for hand power, one emery stand, and will soon put in a grindstone and band saw. I also have a Brooks Cold Tire Setter. I do all kinds of work and build some new work.

M. Sussky, Arkansas.

A Casehardening Hint.—In your December number I noticed a lengthy article on casehardening with which I agree in every particular. There is one method I have used quite frequently which is not mentioned. That is, using equal parts of granulated charcoal and charred leather with a light layer of pulverized yellow prussiate of potash packed well and run three hours. I have hardened small parts to the depth of a of an inch. I find that it is best to buy scrap leather and char it for your own use. It is much better than the truck you buy. I have never used the A. O. Blaich material which the above writer mentions. W. G. Kinch, Pennsylvania.

A Nebraska Shop.—My shop is built of brick, on a concrete foundation. The front, as you see, is most all glass, fronting 51 feet on the principal street of the city. In the rear end I have 18 window sashes of two lights each, 12 by 24, hung on hinges to open for ventilation, and the sashes are six feet above the floor, making a good light and not taking up any room along the wall. I have a

wagons but do not shoe horses any more. I also have a fine writing desk in the shop that I made myself. It is five feet long, with six drawers to keep trade journals, of which I take three, and agree with E. S. Potter about having The American Blacksmith twice a month. I have a good trade and about as near cash as it is possible to get—30 or 60 days. It is not necessary to insult a customer to get him to pay cash, if the matter is rightly laid before him. I find no trouble. D. B. Ebersole, Nebraska.

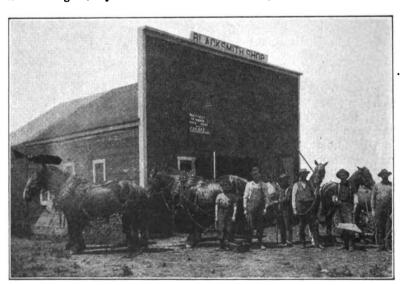
A General Repair Shop.—I have a shop in a good location and do all kinds of repairing, but principally do wagon, carriage, plow, saw, gun and revolver repairing. I have a nice outfit of hand tools, but feel the need of machine tools and power as my trade is increasing rapidly. I have been

Removing the Stuck Pulley.—Answering G. W. H.'s inquiry, would say, some years ago I had similar trouble in a big flour mill, only the pulley was all iron and about six feet in diameter. The set screws had cut rings into the shaft. We finally, after four days of desperate, strenuous, tooth-gnashing, hair-tearing toil got it off by putting a row of wheels, pulleys, collars, etc., on the shaft and setting a screw jack between the pulley and the collars and wheels. Then heating the hub good and hot with gasoline blow torches and pounding off with sledges. You might try this plan and I hope it will work, if someone has not suggested a better one. Don't be afraid to get the hub hot, but don't cool it off quickly.

P. P. GREENE, Oklahoma.

A North Dakota Shop.—Our shop is 24 by 40 feet. We are located in a thriving farming community and, of course, we get work of every description to do. We have plenty of work for two men in the winter and three hustlers in the summer. We have a 31 horsepower Flour City Engine, a polisher, a trip hammer and a power drill. We run a grindstone and also one fire with the engine. We get lots of good things from your valuable paper and would feel lost without it. I hope that the time is not far off when we may receive it twice a month instead of once. I have nothing to offer in the line of advice to the readers as I am only a young smith with but four years of practice. Shoeing is the line I like best and hope the day will come when I will be a first-class shoer and be the proprietor of a good shoeing shop. In the picture your humble servant is seen holding a plowshare and Mr. Gettman, my partner, is on my right holding a spirited driving horse owned by Mr. Mitchell, one of our local business men. C. A. Kelly, North Dakota.

A Letter from Ohio.—In answer to H. B. Goodwin's question in the March number



THE NORTH DAKOTA SHOP OF KELLY & GETTMAN

a mechanic fifteen years, but have been in the shop only four years. My customers say I am the best all round smith they know. My best tools comprise one Western Chief blower, one press drill, one set of lightning taps and dies, one combination saw and grinding machine and a full set of bench tools. R. L. Short, Mississippi.

of The American Blacksmith, would say that if he is a good mechanic and can find a good location the sooner he goes into business for himself the better it will be for him.

I have been a reader of this Journal for about nine years and I certainly do enjoy reading it, and get many good ideas from it and some things that are amusing, too.

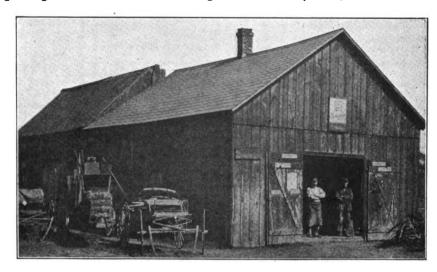
Brothers! what about Mr. Deremer, who drove one hundred and thirty-six shoes in nine and one half hours, and he's an Ohio man, too? I live in Ohio, but now I'm from Missouri. Say, Brothers, he'd keep me busy just leading horses in and out of his shop. He's got me guessing-can't see how R. R. WOLFORD, Ohio. he does it.

A Wisconsin General Shop .-- I have, from time to time, since I became a reader of your very valuable paper, been looking for a few lines from this part. As I have not seen anything, will have to try and send a few words. I have been in business in our little village since 1894 and have done fairly well. but I am at this writing kind of discouraged with the craft in our town. Two years ago myself and nine other neighboring blacksmiths called a meeting for the purpose of getting better prices for horseshoeing and general blacksmithing, with the result that I was elected secretary and chairman and we raised the prices. But we had no sooner got them up till some of the rest of the boys began to advertise among the farmers that I was the one that caused it, which, of course, hurt my trade. Then, to top things out, a scab came in and cut prices and we have had a price-cutter here ever since. But rather than to go down I will quit town.

I have a good shop with machinery and can for that reason do all kinds of work. The other shop is run by an old man that gets a good pension and don't have to make the business pay and can't do much either, but will dab in and shoe horses for fifteen cents a shoe and cause lots of dissatisfaction.

Now, I may not see things right, but I think a small shop with just an anvil and hammer with no stock to keep up can shoe a bandsaw, a planer, an emery stand, a drill press and other machinery necessary for an up-to-date shop. A. M. HAREBO, Wis.

Some Questions from Australia.—1. Will someone tell us the proper way to build sarven wheels? We intend building some very soon. 2. Is there any method of tightening nave bands without cutting one to help and repair, or rebuild any loss which might occur to any brother smith as they can have a mutual insurance company with head offices in Buffalo, and all fire loss or other loss can be published in the Journal every month. I wish to be informed as soon as there is a company of that sort incorporated, as I am in favor of



AN OHIO SHOP WHERE GENERAL SMITH WORK IS DONE

them? 3. What is the best sort of power fan for three or.four forges and the right sort of tuyere iron for same? 4. Could some brother smith tell me of a small furnace that would heat old horse shoes to make new shoes in a profitable way? We have tons of old shoes. We make some over the old way, but this method is not

it and think no better move could be made. All other insurance companies are too high in price and this would be the best.

My prices on shoeing are as follows: Setting wagon tires, up to 2½-inch . . . Setting wagon tires, up to 3-inch . . . Setting wagon tires, up to 4-inch ...
All buggy tires 4.00 2.00 New wagon tongues, no hounds New wagon tongues with hounds ...

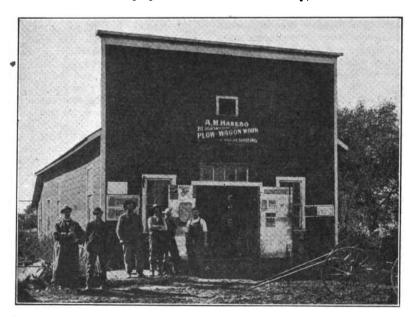
Other prices accordingly.

I have a tire bender which will bend a tire 4 by 1 inch, a Mole Tire Machine and one Western Chief Drill, but I use the old style bellows. My shop is 24 by 30, with one storage building annexed, 16 by 30. I work alone. Sometimes my little girls help me. They are eleven and thirteen years old They unbolt tires and rebolt them for me, which is a great help. The oldest one will clip off the ends of tire bolts and rasp them up as good as I can. There is no use of anyone trying to do it any better.

G. W. HANS, Ohio.

Removing the Pulley.-In the February number, G. W. H., of New Hampshire. wants to know how to remove a thirty-inch pulley from shaft. Let him take a bar of 24 or 3-inch iron about 5 or 6 feet long and suspend it from the middle by a 3-inch rope. just high enough to reach his pulley hub over the shaft. Now, get two men on the back end or the end farthest away from pulley and himself next to the pulley end to guide his bar so it will strike fair on the pulley hub. Now, all together, bring this battering ram back and then swing forward against the pulley hub. This will certainly take the pulley off, as I have seen this method used to take crank pins out of locomotive wheels with great success. If he has no iron suitable, an old piece of railroad rail may answer his purpose.

A. L. Ericson, Illinois.



A GENERAL SMITH SHOP OF WISCONSIN

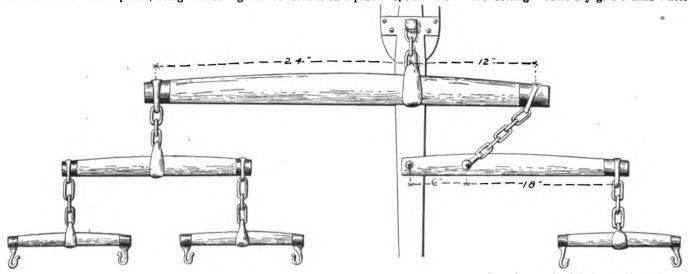
for fifteen cents during the shoeing season and make it pay fairly well. But when plows and other work that requires skill and good workmanship are needed these customers will have to come back. But I ought to turn them down and let their botch workman do that also. Would some kind reader give me a suggestion for this trouble? The picture shows my shop which is twentysix by fifty feet. I have a gasoline engine, rapid enough. 5. What is the best make of power hammer to use in a blacksmith shop? 6. Could any smith tell us of a good method of brazing a bandsaw so it will not break where it has been brazed? ISAAC BARTON, Australia.

An Ohio Shop.—Just a few words in regard to the insurance of all blacksmith shops, which I would regard as a good step to take. It would not come hard for any-

Repairing Gun Breech.—I will now give my remedy for tightening a gun in the breech. In the February number a young smith with only one year's experience wants to know how. My method of tightening a gun is to remove the locking bolt from gun, heat it to a light red in the forge and hammer it from the top side, being careful he wants to know how a man would set an axle to make the wheels track if one wheel has $\frac{3}{4}$ of an inch dish and the other 3 inches, without breaking one wheel and rebuilding it. There is just one way it can be done, and that is, just give the spindle that the dished wheel goes on enough pitch and gather to fetch it on a plumb spoke. Re-

that he would get \$21,474,836.48 for the thirty-second nail. But he claims that he would get \$42,911,872.95 for driving four shoes. I figure that he would get \$42,949,-672.95. Now, I may be wrong, but I'll have to be shown.

There has been a considerable said about tire setting. Some say give a hind wheel



From a former number of The American Blacksmith.

BROTHER E. A. WRIGHT'S PLAN FOR A THREE-HORSE EVENER. HE SAYS IT WORKS VERY WELL ON A WAGON OR DISK HARROW

to keep the bottom side straight and with a little drop down if the gun has two catches. If a double catch gun, as it is termed, treat both catches alike. It might be well to notice how the bolt is pinned that goes through the frame just behind the fore end. This bolt acts as a hinge and if it is worn much will allow looseness. Hammer the bolt with worn side facing the breech but be careful not to hammer too much. If after upsetting locking bolt and putting gun together, the bolt does not go in catch enough to allow gun to breech, file bottom of catches on barrels until it will just come together.

R. L. Short, Mississippi.

Several Questions for Readers.—I would like to know what the "Trek wagons" are? Are they dray wagons? In answer to H. B. Goodwin, of Missouri, it is better to own his own shop. If the readers agree on your paper coming twice a month, let them take time to write to tell you how a tool is made instead of a personal letter. And you could publish articles out of the various blacksmith books that are on the market which would help increase the sale of the books. Can any reader give a description how photographic gallery cars are made? Those that are mounted on four metal wagon wheels? They are somewhere near 20 feet long and about 8 feet wide. I agree with J. A. B., Minnesota, in regard to licensing horseshoers. Your paper from cover to cover is all right in every way, As to the kickers, we can always learn something from them. I would like to know how to make a foot power striking hammer.

D. J. DODRILL, Colorado.
NOTE.—The "Trek Wagons" of South
Africa are similar to our "Prairie Schooners" of the West. They are wagons for
traveling long distances.

Making the Wheels Track.—In reply to the question of Mr. Robert Green, South Africa, regarding the axle setting problem.

gardless of the looks, of course, the top of the wheel might "lean toward Jones'es" somewhat, but if I had a customer that was so dumb as to advocate such a thing as that it is just the way I would fix it. agree with the writer as to a mechanical job of it, it cannot be done. I have worked some twenty-seven years at the trade as a blacksmith and wheelwright and I know enough about it to know that such work as that cannot be done in a mechanical manner. Of course, you will find some wise farmer that thinks he knows more about blacksmithing than a smith, and they are the ones. I like to do work as they suggest and then they are satisfied, and you are satisfied that you will get it to do over at your own planning and they will say nothing C. W. Metcalf, Iowa. about it.

A Three-Horse Evener.—Who is able to make it? Will some member of the craft tell me how to make a three-horse evener that will work on a cultivator with a tongue, placing one horse on each side of a tongue with one horse in the middle. I would like very much if some brother would give a diagram or cut of such an evener. I have many calls for such and wish very much to see a cut.

J. R. King, Texas.

Shoeing and Tire Setting-I see among the Heats, Sparks, Welds, of the January number, where you ask if I agree with all that is said in these columns. As a matter of fact I do not, still I have no complaint to make. The Journal is tip top just the way it is and it doesn't need any more about horseshoeing in it than it has had, that is, according to my judgment. Those fellows that want more about horseshoeing, I think, had better get William Russell or Prof. Rich's work on horseshoeing, then they can read about horseshoeing till they are sick of it. One thing that I do not agree with in the January number is the way Mr. J. R. S. of Oklahoma figures that nail problem. Now, I will agree with him

of a wagon 76 draw, others say 1, others say , and some say just give it the heat that is in the tire. My opinion is that there can be no strict rule as to just how much draw to give, for it depends on the condition of the wheel, on the thickness of the tire and on how many trips you made to the shrinker. If you get it just to suit you the first time you have only a short space heated, but if you have to heat it again even though you heat it in the same place the heat will crawl each way on the tire while you are heating it the second time. Then you have more heat in the tire than you had when you measured it after the first shrink, consequently you don't need so much draw to get the same result. It also depends on the size of your firepot. I have learned, by working in several different places, that I must take into account the size of my firepot before I decide how much draw to give; for a pot, say 14 inches wide, will heat 14 inches of the tire, while a 10-inch pot will only heat 10 inches of the tire, therefore, with the small pot you have less heat and you can give more draw.

Now, I am not an old smith, but I have worked in several different places for the time I have been at it. I don't consider that it takes long years of experience to learn to set tires. A man might work at one forge for twenty years and never discover the fact that he would have to give more or less draw at another man's fire to get the same result. An apprentice once worked in the same shop where I did and he could skin the old boss setting tires before he had been in the shop eight months. This demonstrated to me that long years of experience was not necessary. A long head seemed to work just as well. If the rest of you readers don't agree with me, just rip into me. I like to hear you come. I can take it with as little grief as anyone.

F. J. C., Nebraska.



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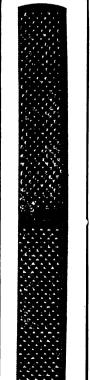
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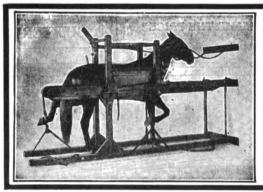
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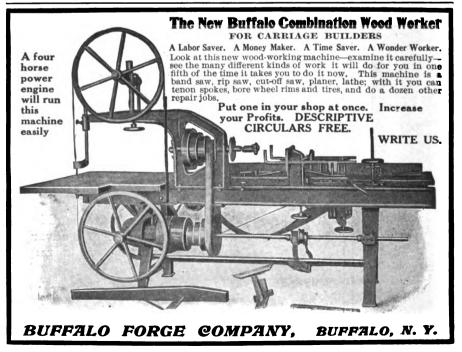
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The following quotations are the prices generally quoted at Chicago, April 12, 1909, and are subject to fluctuations. Corrected for The American Blackswifth by The National Heavy Hardware Reporter, Chicago.

Correspondents report no changes in heavy hardware items from last month and trade conditions are stated as improved. Wood stock prices are firm. Trade on shoes, calks and other shoeing items is light.

The mild winter has made light work for the horseshoer, and blacksmith work generally has been light. Trade has improved, however, and still greater activity is looked for.

Horse Shoes—	
All Iron Shoes	\$4,40
Steel Shoe	4.25
No. 0 and No. 1 25c extra. 15c. per keg	
additional charged for packing more	
than one size in a keg	
Mule Shoes	4.90
Featherweight Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes.	5.75
Ideal Countersunk.	6.00
Goodenough, heavy	6.00
Coodenough sham	6.50
Goodenough, sharp	
Toe Weight	7.00
Side Weight	9.25
Track Weight	9.50
E. E. Light Steel Steel Driving	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50
Merchant Bar Iron-	
\$1.70 to \$1.90 rates full extras, and 20 cer	nts per

100 pounds extra for broken bundles.

Steel Bars— \$1.60 to \$1.80 rates, full extras,

Toe Calks— Blunt Sharp	Per box \$1.30 1.55
Carriage Bolts— 6 x § and smaller Larger and longer	.60– 10%
Machine Bolts— 4 x 1 and smaller Larger and longer	
Nuts— Less than 10 lbs, of a si From 10 to 50 lbs	ze
Washers— Same price as nuts,	Skeins— Cast 65%
Maileables— Common \$.09	Half Patent Axles —
Springs— Single Spring, each Springs, black and half l	
	t— \$.09½
Ash and Oak Lumber-Per	Foot-

Ash and Oak Lumber-			
1-1})7 2 <u>-</u> 3.		8 .08
11-2)7 <u>}</u> 3 <u>}</u> −4.		.09
Yellow Poplar Lumber			10 . 01
		13 to 17	18 to 24
]	\$65.00		\$7 5.00
*	65.00		80 00
<u> </u>	68.00	75.00	85.00
[.]	72 00 ı	80.00	104.00
Rough Hickory Axles-			Each.
3 x 4 6 ft			. \$.60
3½ x 4½ 6 ft			. 1.00
4 x 5 6 ft			. 1.20
5 x 6 6 ft			. 2.20
4 x 5 6½ ft			
41 x 51 65 and 7 ft	t		. 2.00
5 x 6 6 and 7 ft			3.00
Finished Hickory Axles			
For 21 and 21 Skein	s		. \$1.00
For 3 Skeins			. 1.20
For 31 Skeins			
For 31 Skeins			. 1.60
For 3 Skeins			. 1.95
T . (1)			2.22

32 x 02 03 and 1 iv	₩.00
5 x 6 6 and 7 ft	3.00
54 x 64 7 ft	3.50
Jakua I It	3.30
Finished Hickory Axles—	
	_
For 21 and 21 Skeins	\$1.00
For 3 Skeins	1.20
For 31 Skeins	1.45
For 3½ Skeins	1.60
For 31 Skeins	1.95
For 4 Skeins	2 25
TOI T DACIUS	2 20
Rough Oak Bolsters-	
Kondu Ony Domicis	
Short	- \$.08
12-14-16 ft	.09
Finished Oak Bolsters-	
21 x 31 and under	\$.65
3 x 4	.70
31 x 42	.90
••••••	
Rough Oak Wagon Tongues-	
4 x 4 x 2 x 4 x 12 and smaller	-1.00
4 X 4 X Z X 4 X 12 and smaller	\$1,00
Finished Oak Wagon Tongues-	
31 and smaller	\$ 1.25
3	1.30
4	
7 ••••••••••••••••••••••••••••••••••••	1.40

Two Inch Sawed Hounds Tongues Front	. 45
Hind Patent Wheels— A. B. No.13 and under.	
A. B. No.13 and under D. No. 13 and under All Grades, No. 17 to 33 All Grades, No. 39 and Larger C. No. 13 and under	. 35-5 % . 20 %
7 x 8 x 9 \$1.10 10 x 14	11 ubs-Bet . \$2,90
7 x 9 x 10 1.10 11 x 14	4.00 4.50
8 x 10 x 11 . 1.50 11 x 16 9 x 10 x 12 . 1.70 12 x 16 9 x 11 x 12 . 1.75 12 x 17 10 x 12 x 13 . 2.60 13 x 18 11 x 13 x 14 . 3.65 12 x 14 x 15 . 4.50	. 5.50
Kough Sawed Felloes-	•
1 x 2 1.75 2 x 2 1 x 2 1.85 3 x 3	2.00 4.75 5.75
Ironed Poles. White, XXX— 13 x 21" No 2	. \$4.00
Isoned Shefts White YYY-	
1	2.35
Farm Wagon Bows— Round Top, 1 x 2 *	. \$.65 80 . 1.40
Standard size Piano Bodies with Seats— Each	. \$4.25
1 Horse	. \$.70 85 . 1.00
All Hickory and Oak Spokes and Patent Discount from Weis & Lesh List No. 5	Spokes-
Forest Second Growth Second	White
2½ x 38" . \$2.15	. 25 . 50
3 x 44" . 4.70 6 95 8	.90 .50
Mixed Forest Second Growth Second	. 50
$\begin{bmatrix} 217 \dots & 1.70 & 2.95 & 3 \\ 227 \dots & 1.80 & 3.05 & 3 \end{bmatrix}$.60 80 .20
3 X 40° 2.05 4 00 4	.85
Single Trees—Round— Forest Second \$2 10	RO .
3 · · · · · 3 · 45	.65 .75 .25 .80
Oval Plow Doubletrees— Flat Plow Doubletrees— \$1.75	\$3.00
Wagon Doubletrees— 2 x 4 x 48"	. \$3.60 . 4.80
2 x 4 x 48" 21 x 48" 22 x 41 x 50" 21 x 41 x 52" 21 x 5 x 52"	5.20 . 5.60 . 6.40
24 x 5 x 54" Mixed Second Growth 50 % White Second Growth 100 %	advance
Oval Plow Singletrees— 2½ x 30° and under	Forest . \$1.00
Buggy Doubletrees-	. 1.25 Thite
Forest Second Growth Second	Growth
Express Doubletrees—	/hite
Forest Second Growth Second 21"\$2.95 \$3.65 \$5.21"\$3.55 4.15 5.3"\$3.55 4.30 55.	l Growth .00 .50 .75
Express Singletrees, Turned— Mixed W	/hite
Forest Second Growth Second 24" \$2.50 \$2.65 \$3.24" 2 90 3.65 4.	Growth 75 00
2½" 3.50 4.00 4.	.75

Mixed
Forest Second Growth Se
2 x 42" ... \$2.75 \$3.50
2\frac{1}{2} x 2\frac{1}{2} x
42" ... \$3.15 \$3.75 ...

Buggy Neck Yokes-

Express Singletrees, Square Center—

Mixed White

Forest Second Growth Second Growth

21". \$3.00 \$4.15 \$5.25

21". 3.50 5.45 6.00

Mixed

White

scond Growth

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Will start and run your Gas or Gasoline Engine without the aid of batteries. Inexpensive and absolutely reliable for either make and break or jump spark ignition. Information sent on request.

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GOES LIKE SIXTY SELLS LIKE SIXTY \$60 GILSON ENGINE Separators, Churns, Wash Ma-GILSON MFG. CO. 39 Park St. Port Washington, Wis.



Buy a powerful engine that is durable, economical and absolutely safe.

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relation to the full rated horse power and more. They are guarated for five years at any kind of work, never shut down or repairs, are absolutely simple in operation, and all sizes turnish the cheapest power for every purpose. Best for machinists, miners, millers, manufacturers, printers, farmers—for drilling, pumping, running air compressers, dynamos, etc.

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and run it without the aid of batteries. Not a cheap magneto but the original high grade speed controlled friction driven dynamo. Parfacility

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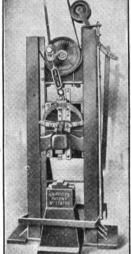


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GRIFFITTS BELT POWER HAMMER

MADE OF STEEL Every Part Riveted

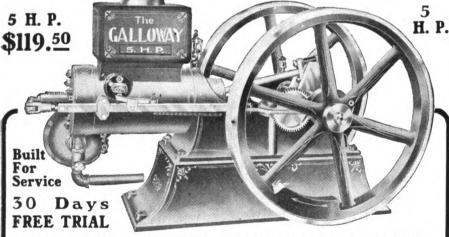
It is the strongest and most durable hammer made. The best all-around ham-mer for blacksmith and wagon shops. It will not get out of order; will not work loose.

loose.
This machine will help you do better, quicker and cheaper work. Get our full description and prices.

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GALLOWAY GASOLINE

Owned and Made Exclusively by the William Galloway Co., Waterloo, Iowa

Owned and Made Exclusively by the William Galloway Co., Waterloo, Iowa will run your shop at several times its present capacity and enable you to take lots of jobs that you have to turn down now because you have not the capacity.

Only four things to do: Turn on the switch, turn on the oil, turn on the gasoline, give the fly wheel a start, and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs.

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Ask for my free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure.

WRITE TODAY.

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SPRING CUSHIONED HELVE.

A First-Class, Medium-Priced Machine. The Best Helper for Your Shop. Will Soon Pay for Itself.

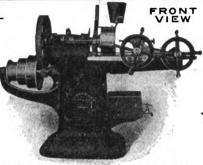
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A Bolt Cutter is Much Like a Man in This THE HEAD IS NEARLY EVERYTHING

The Merriman Bolt Cutter Head is noted for: Simplicity of the Head—only four parts. Great Durability—few repairs needed. Square Bearing of the Dies in the Ring. Solidity of the Dies like a Solid Die. Uniformity of the Product—Bolts all the same size. Effectiveness of Operation—Cheapest help can understand and run it. No machine turns out work more rapidly. turns out work more rapidly.

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A Postcard will bring it.

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GASOLINE ENGINE

Built especially for Blacksmiths' Use. 2½, 3½, and 6 H. P.



Look at the other engines first. Note the multitude of rods, springs and triggers described as simple. Remember that the water tank (always left out of the cut) has to be filled and emptied every winter day. To forget it once may mean a ruined engine. Remember that water-cooled engines all have packed cylinder heads. Packing leaks and blows out. Inevitable trouble and loss of power

have packing leaks and blows out. Inevitable trouble and loss of power sometime.

Then look at an engine that IS simple One-piece cylinder—no chance to leak—grows stronger with use. Everything enclosed—no frail parts—no water—not a piece of packing, or a gasket in it—no gasoline pump troubles. It absolutely cannot be overheated under full load—any temperature—any length of time. Your judgment tells you to

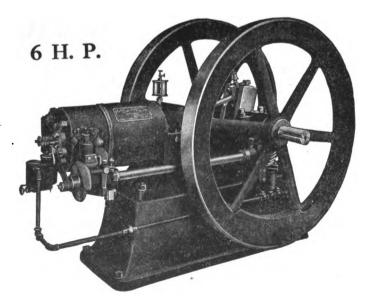
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THE MOST RELIABLE HELPER IN A SHOP



Thousands of Blacksmiths using and selling WEBER ENGINES.

We have a special proposition to make you on a 6 H. P. Engine.

Buy Direct from Factory with 25 years' Reputation for Quality and Reliability.

Install your power NOW and be ready for the Spring rush.

Over 20,000 WEBER ENGINES in actual service.

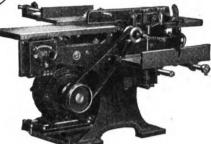
Send for Booklet 103, "How to Buy the Best Engine."

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MAY, 1909

FOR THE WOOD WORKER



Crescent Variety Wood Worker, showing Jointer and Borer



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Send for special circular giving complete description of this machine, also ask for complete catalog describing Band Saws, Saw Tables, Jointers, Shapers, Borers, Swing Saws, Disk Grinders, Planers, Planer and Matchers, Band Saw Blades.



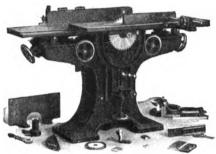
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The Crescent Variety Wood Worker

is the machine you need to help you earn more money. It is the most substantial combination machine ever offered at a popular price. With it you can do sawing, jointing and boring without making a single change in the machine.



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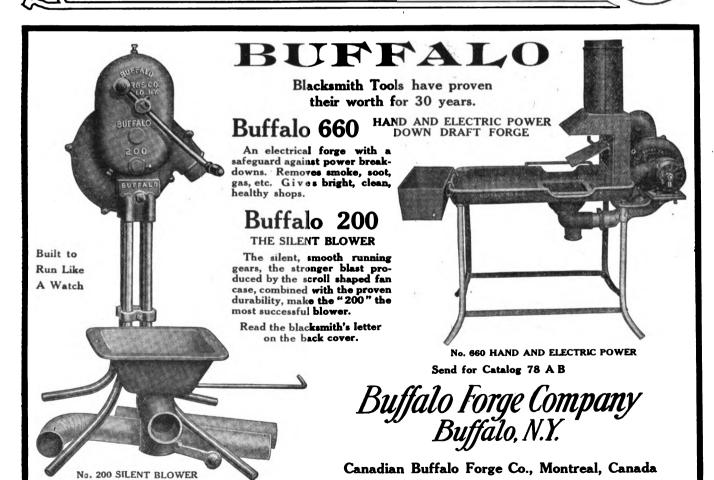
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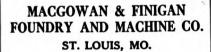
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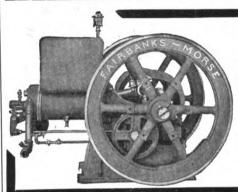
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Are the results of TWENTY-ONE YEARS of GAS ENGINE EXPERIENCE, and are built in the LARGEST EXCLUSIVE GAS ENGINE PLANT IN AMERICA. The only engine with the famous WIPE SPARN IGNITER, which means certain starting and never a skip under any conditions. It is the Engine of CORRECT BALANGING, PHOSPHOR BRONZE BEARINGS, VERTICAL VALVES, ACCESSIBLE DESIGN, and a dozen other points of superiority. Write today for our Free 40-Page Foos Book No. 49, describing points of superiority. Write today for our the WORLD'S GREATEST ENGINE.

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EVERYTHING NEEDED FOR IGNITION

The Dayton Electrical Mfg. Co.

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For Plow Work, Wagon Work, Heavy Work, Any Work.

"Will strike as you like." Heavy or light at full speed or less, A broken anvil will cripple no other part of the hammer.

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WORTH MORE COST LESS Than Any 50-lb. Steel Head Hammer on the Market. Hook'er to your Ingin.

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"OUICK ACTION" IGNITING DYNAMOS Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils, Send for Catalogue B.

The Knoblock-Heideman Mfg. Co., SOUTH BEND, IND.

GASOLINE ENGINE BARGAINS

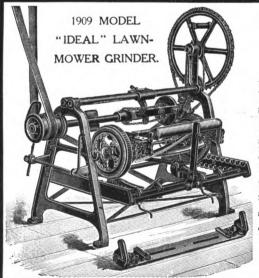
Our prices are from 30 to 60 per cent less than new outfits. All engines are thoroughly over-hauled and rebuilt. Guarantee given with each sale to repair or replace any part of engines giving out, owing to defective material or workmanship, during the period of one year from date of sale. We have a stock of more than 125 engines of many makes, ranging in size from 1 to 130 H. P. Here are a few of the engines we have ready for prompt shipment:

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cleton or Stickney
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Write and tell us how much H. P. you want and we will promptly quote you prices on the engines we have which would suit your requirements,

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"You Grind it as You Find it."

The 1909 Model of THE "IDEAL" Lawn-Mower Grinder

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THE CRENSHAW SPOKE PULLER

IS THE MARVEL OF THE AGE

A thoroughly practical labor-saving device; will extract the spokes from any hub in a few minutes' time by simply opening out the levers and placing the spoke puller plates against the hub and then drawing levers together. This machine does with ease what has heretofore been tiresome, tedious and time-consuming work.

Order from your dealer, or write direct for full information.

THE SPOKE PULLER MFG. CO. 516 Empire Building, ATLANTA, GA.



Shows machine in operation.



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the guaranteed capacity of this wagon.

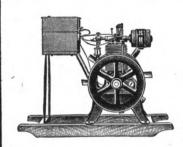
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It has angle steel hounds front and
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One man can load it; saves an extra
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Send for free catalogue and prices.
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"THE MASTER WORKMAN,"
a two-cylinder engine; revolutionizing power. Its weight and bulk are half that of single cylinder engines, with greater durability. Costs to Buy—Less to Bun. Quickly, easily started. Vibration practically overcome. Cheaply mounted on any wagon. It is a combination portable, stationary of traction angine. Send for Catalogue. The Temple Pump CO., Mirs., Meagher and 15th Sts., Chicago. Chils 18 (OUR) FIETY SIXTH YEAR.

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MAKE THE TEST YOURSELF with your own machines

We believe a careful trial of

THE WHITE LILY GASOLINE ENGINE

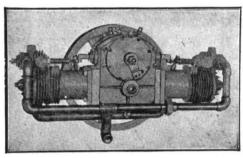
will convince you that you need it in your shop

WE know what a White Lily Engine will save you, but we want you to prove it for yourself, at our expense

Write today for Catalog and Full Particulars

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Build Your **Own** Motor **Buggies**

No Iron Working Machinery or Machinists Necessary.

Buggy can be finished ready to run without any Iron working machinery or expert

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AUBURN MOTOR BUGGY CHASSIS CO.,

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LICHTNING **GASOLINE ENGINES**



Steam Cooled Double Piston No Foundation

Send for Catalogue Showing Superior Points, and get

KANSAS CITY HAY PRESS CO. Kansas City, Me

KERRIHARD'S 1909 POWER HAMMER KERRIHARD'S COMBINED SAW AND GRINDER

Sent on Approval ORDER TODAY OR

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Less Wheel and Saw



Write today for Complete Circulars.

Address, HAMMER AND GRINDER DEPT.

KERRIHARD CO., Red Oak, Ia.

In writing mention "American Blacksmith"

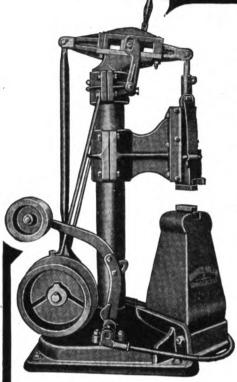




COMBINATION SAW AND GRINDER

\$60.00





Note the new square base, a marked improvement, adding about 100 lbs, to weight of machine.

THE MODERN POWER HAMMER MAKES SMITHING EASY

IT will do all your hard work with least amount of power; will increase your output; will save you time and labor and multiply your profits. Soon pays for itself and helps you to successfully meet competition.

The Hammer That's Built Mechanically Right
The Backbone of Blacksmithing

The only hammer on which you can get a light, elastic blow at full speed. Strikes a light blow as rapidly as a heavy blow. Most practical adjustments, permitting widest range of operation. Nothing before the face to prevent seeing your work. Many other points of superiority all contained in our free booklet.

Write your jobber today or write to us.

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POPLAR TOP SLATS

WAGONS AND MOTOR TRUCKS

F. F. BOWN MFG. HOUSE

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Double Bead with Oval Back When used on Round Cornered, Oval or Round Bows, they are ready for the Duck as soon as nailed on Bows, as no work is required dressing off corners on back of slats to keep from cutting into the covering. 1% wide in 8, 10 and 12 lengths. 1% wide in 10, 12, 14 and 16 lengths. Single Bead with Straight Back For Flat and Coach Top Work where slats are placed close over entire top. One width only—1%" in 16', 17', 14' and 16' Lengths.

ALSO HICKORY GEAR-SPOOLS AND HICKORY BENT-SEAT-STICKS

Trade Literature and Notes.

Trade Literature and Notes.

THE CENTRAL MACHINERY & SUPPLY CO., whose announcement appears on Page 42, sell plumbing and heating supplies, roofing, etc., direct to the consumer. They take the plans of any house, be it in the city or in the country, and figure up from those plans all of the material that would be needed to install first-class plumbing in the house, and they will supply the plumbing fixtures with iron pipe threads on the outlets and supply the whole thing in such convenient shape that any mechanic can install the fixtures and do all of the work.

For those communities where there is no city waterworks available they have a pneumatic water supply system to offer, and this system supplies running water on a small or large scale. Their catalogue fully describes the pneumatic water supply system. It is certainly a most satisfactory and up-to-date method of supplying the country home with running water and there is nothing difficult about the installation of such a system. Any blacksmish would be able to do the work.

Their catalogue lists in plain net figures prices on all kinds of plumbing material, heating apparatus and tools, and a copy will be sent free on request.

In heating apparatus they will take the plans of any building and figure the right amount of radiation for each room and the right size boiler to heat the entire building, all of the necessary pipe and fittings to cover the installation, and make quotations on a complete plant. They furnish to every purchaser without extra charge complete working drawings, showing just how to install the material and there is nothing to installing from plans but cutting and threading pipe and screwing it together.

WHEN MORGAN & WRIGHT, the well-known hoof-pad manufacturers, moved into their new

screwing it together.

WHEN MORGAN & WRIGHT, the well-known hoof-pad manufacturers, moved into their new factory in Detroit two years ago it was thought that the growth of business for years to come had been provided for. Last year the capacity of the plant, working night and day, was said to have been taxed to its utmost to fill orders promptly, and it was decided that an addition would be necessary to meet the requirements of this season's business. Building operations, nearing completion, will increase the floor space of the big Morgan & Wright plant by over 20 per cent.

IT WILL INTEREST SOME OF OUR READ.

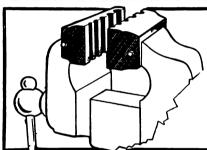
IT WILL INTEREST SOME OF OUR READ-ERS to know that The Gilson Manufacturing Co. are building a large addition to their plant at Port Washington, Wis., to facilitate the manufacture of the Gilson "GOES LIKE SIXTY" Gasoline Engines.

MONTROSS METAL SHINGLES

Have given entire satisfaction for the past twenty years. They are no experiment. With proper care, will last as long as the building. Fire, lightning and stormproof. Light, durable, attractive. Will not crack or scale. Galvanized after embossing. Easily and quickly laid with hammer and nails; no soldering. Inexpensive. Write today for our catalogue. Address. 100 ERIE STREET.



METAL SHINGLE CO. CAMDEN. N., MONTROSS



BLACKSMITHS, YOU NEED A **BOLT HEADING ATTACHMENT** FOR YOUR VISES.

A most convenient tool for heading bolts, holding iron while cutting threads, making short bends, or any other purpose for which you want iron held tightly. Held securely to vise with sef-screws. Easy to put on and take off. Will not mash iron out of shape. Made in different sizes to suit all sizes of vises, Will give free with each one a 6 inch ratchet wrench worth \$1.00.

Manufactured and sold by THOS. A. COOK, BUTLER, ALA.

AIR CUSHION RUBBER PADS



See That Cushion?

It fills with air at each step. That's what breaks concussion. That's what pre-vents slipping. That's what keeps the foot healthy. That's what cures lameness.



NO **LAMENESS** MO SLIPPING **CHEAPEST** AND BEST



REVERE RUBBER CO.

Sole Manufacturers

BOSTON, MASS.

ANVIL WORKS **ESTABLISHED**

200 DIFFERENT WEIGHTS AND SHAPES FROM 10 LBS. TO 800 LBS.



NONE BETTER MADE **OVER 300,000 IN USE**

THE ANVIL OF MANY MEDALS.

The "EAGLE ANVIL" has taken FIRST PRIZE wherever exhibited. When a man who KNOWS is ordering he always says: "Nothing but an Eagle for me." Because he knows that the body of the Eagle Anvil is made of unyielding crystalized iron, with hardened steel face, and not of fibrous wrought iron, that is sure to settle in face after a few

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The "FISHER" Parallel Leg Vise is the only Leg Vise made having jaws that always remain parallel at whatever opening.

It is made heavy enough to withstand all strains and will last

We also make a light, parallel BENCH VISE of superior quality, fitted with plain or swivel base

Write for our descriptive Anvil and Vise Catalog.

Our goods are handled by reliable dealers everywhere.



PARALLEI. STRONG AND DURABLE.

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IT WILL PAY YOU TO STUDY THIS

Scientific Hoof Pad

T conforms scientifically to the requirements of the hoof, having full width of rubber at the heel and permitting full shoe at

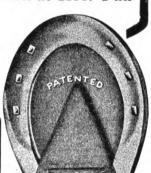
the walls of the hoof. It conforms exactly to the frog, which is thereby permitted to perform its natural functions of feeling the footing. Comfortable, clean and sanitary; always affording a perfect grip on slippery pavement.

The Acme of Perfection in Hoof Pad Construction.

Order a few trial sets from your jobber, watch their good service and performance on a few of your best customers' horses and you'll tie up to the "Scientific" for sound business reasons.

THE SCIENTIFIC HOOF PAD CO.

YOUNGSTOWN, OHIO





REGISTERED
Patented March 24, 1008

15,000 Sets
WELDARINE

Sold in 1908 spells
SATISFACTION

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Large Sets, \$3.00 Small Sets, \$2.00

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First-Weldarine is the only successful compound for brazing cast iron on the market.

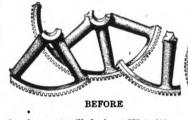
Second—We can show you a greater net profit by using Weldarine than on anything else you have in your blacksmith or machine shop. **Third**—Weldarine is sold under a positive guarantee.

Fourth—We can prove every statement we make. Will you let us?
Weldarine is handled by 150 of the best Heavy Hardware Jobbers in the United States. Write your Jobber, or

THE WELDARINE MFG. CO.

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One large set will do from \$75 to \$90 worth of work; small set from \$30 to \$40 worth.

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STAR STEEL SHAPES

For Your Spring Business.



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Plow Shares
Quick Repair Shares
Cultivator Shovels
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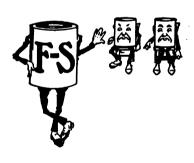
Any Size or Quality desired.



All Jobbers Handle Them.

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"Just as good" kinds take a back seat when "F-S" products step in.

"F-S" brushes are made for long, hard service. That's why painters prefer them.

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Gives Longer Life

to your tools, effects a saving of time, labor and material. Means more profits for you.

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Sample free, enough to give it thorough test. Mention nature of your steel hardening work and name of your supply dealer.

Write us today.

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DO YOU KNOW STEEL?

Do you know how to buy, work, temper, forge and harden it? Do you know how to make furnaces, and baths for heating and tempering it?

The American Steel Worker By E. R. MARKHAM

will tell you all about steel manipulation. Mr. Markham has had over twenty eight years of experience in steel working and he knows. His book gives you just the information you want on the subject of steel. It contains over 350 pages, and is well illustrated with many excellent engravings. The book is bound in green library cloth on heavy boards, with titles in gold, and will be sent postpaid to any address on earth for \$2.50.

AMERICAN BLACKSMITH COMPANY P. O. Box 974 Buffalo, N. Y.

You can have Modern Sanitary Plumbing Installed in your home at a very low cost, for our "All Iron Pipe" system enables any handy mechanic, without previous experience, to do the work.

DON'T BE HELD UP for an exorbitant sum in order to possess these conveniences, for we will sell you the material at lowest wholesale prices.



including all ma-terial needed.



\$247 for all the material for a hot this 11 - room



180. A first class of water heating lant for this 8-



\$135 is all it cost for a hot water heating plant for this 5-room cot-

(11434)

MINI

THERE IS NO MYSTERY about the pipe work for plumbing. Look at the picture. The large vertical pipe is the stack. The smaller vertical pipe is the vent. All fixtures are trapped to prevent odor or sewer gas escaping into the rooms, and are so connected as to be properly vented. This is a fair type of Sanitary installation. We will arrange any variations for you to supply you the most perfect arrangement for your home.

Whether in the city, where you have running water and sewerage, or in the country, where you have these improvements. We will sell you all the material of all kinds needed, make you working drawings, and tell you how to do the work.

JUST SEND US A PLAN of your house for our free estimate of all the material required to put

A Hot Water or Steam Heating Plant

SOLD DIRECT TO YOU AT MANUFACTURER'S PRICE

Don't say you can't afford a new heating plant for your home until you get our prices. They will surprise you—and we furnish plants in such convenient form that you can install them yourself if you want to—or have a handy man to do it at day laborer's wages. Get ready fot next winter now. It costs you nothing to have us make an estimate for you—and we not only save you about 50% in the cost, but

We Guarantee Satisfaction

You take no chances. We write it in the contract that our plant will supply the temperature required in each and every room, and hold ourselves in readiness to supply, free of all cost, all material, should any oe needed to bring the plant up to our guarantee. Should the plant at any time within one year prove a failure, or unsatisfactory to you, we will refund the entire purchase pricoping the return of the plant to us. We will make you complete working drawings, showing but to do the work so that you can't go wrong. We spare time this summer in installing a high-grade plant at low cost.

Remember we guarantee our plant in every way. You can't get a better, even if you pay twice as much. Write for information blank.

READY ROOFING

We are offering the entire factory output of mill ends of Extra High Grade Vulcan Roofing. This is the regular \$3.00 grade of Ready Roofing, but there are two or three pieces in each roll of 108 square feet, or enough to lay 100 square feet. Fire Proof! not affected by Heat or Cold! Permanently Weather Proof. Stock limited, While It lasts at per roll.

STEEL ROOFING

Write for Free Samples. Order at Once.

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The hot water heating plant which you sold me for my house is perfect.

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We will sell you a Complete Plant or a Single Fitting. No order too large, none too small.



The Home of the Central Machinery & Supply Co.

Our Free Catalogue No. 90 shows plain net prices for for it today. We also handle light and heavy machinery, gasoline engines windmills etc. for it today. windmills, etc.

Central Machinery & Supply 6. 2585 Archer Avenue. Chicago, III.







describes the operation fully. Price from \$40 up.





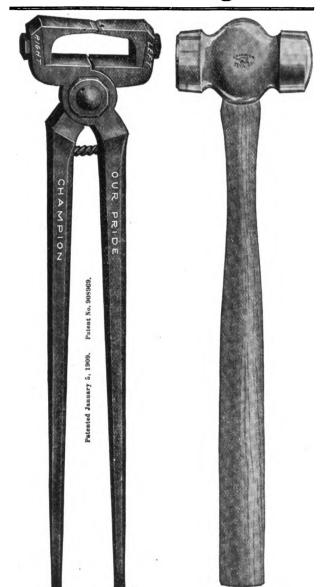
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will cost you. You should have this book, which shows

82 Labor-Saving Tools



No. 81 Our Pride No. 81
Ball Bearing Hoof Shear
12 inch 14 inch
BALL BEARING JOINT
Interchangeable Blades

Drop Forged

No. 4 Weighs 12 to 3 lbs.

MAUD S

ROUNDING HAMMER

Swings Just Right

Drop Forged

Our tools are tempered in PLAIN COLD WATER and can be redressed and retempered by any practical man.

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Dept. A.

MEADVILLE, PENNA.

Reece Combination Screw Plate No. 103

\$8.25 NET WILL BUY ONE



The No. 103 Reece Combination Screw Plate

includes one Reece Adjustable Guide Stock, 24 inches long for 2 7-32 inch diameter DIES; Three individual Full Mounted Stocks; Seven Plate Taps and Seven Reece Adjustable Dies, cutting 1-4 — 20, 5-16 — 18, 3-8 — 16, 7-16 — 14, 1-2 — 12, 5-8 — 11, 3-4 — 10. REMEMBER that this is practically a FULL MOUNTED SET. REMEMBER that the Stocks have MOTTLED FINISH; that the DIES are adjustable, and make perfect threads at one cut; that four persons can use dies from this set at the same time because there are FOUR STOCKS. And LAST, but not LEAST, REMEMBER THE PRICE is only \$8.25 NET, and the Screw Plate guaranteed to give satisfaction or your money will be refunded.

Can You Afford to Neglect This Great Opportunity?

We request you to place your order with your dealer. If for any reason he cannot fill the order (and he can if he wants to), THEN send to us. DO NOT ACCEPT SUBSTITUTES—INSIST on having the REECE COMBINATION SCREW PLATE No. 103.

THE E. F. REECE CO., Greenfield, Mass., U. S. A.



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Sold by all Jobbers

Little Giant Punch & Shear Co., Sparta, III.



RUBBER TIRED RUNABOUT, \$42.00 Top Buggy, \$35. Buggy Tops, \$4.60

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It's free. Compare our prices.

Established 1882. BUOB & SCHEU, 0-520 East Court (CINCINNATI, OHIO



Clip Horses For Profit

This splendid machine only \$7.50. It is the Stewart No. 1. Send \$2 and we will ship it C.O.D. for the balance. If you are not pleased, return at our expense and get your money.

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Gasoline power has proven more economical than any other power for general purposes in factory, shop or mill. That is one reason why I.H.O. gasoline engines have become so popular. Vertical—2 and 3-horse power. Horizontal—(portable and stationary) 4, 6, 8, 10, 15 and 20-h.p. Air cooled—1-h.p. Write for catalog and full information to International Harvester Company of America, Inc., 13 Harvester Building, Chicago, U.S.A.



The New Little Giant Trip Hammer

Made in 3 sizes

25 lbs. 50 lbs.

100 lbs.

Over 2.000 Now Sold

The Best Power Hammer on the market. Works material up to 5 in. round.

FULLY GUARANTEED

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To Find Address of any Firm given here, consult their advertisement. For its location in this issue, see Index on Page 30.

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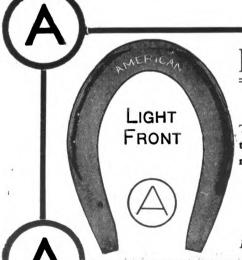
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The most complete line for you to select from. Material and workmanship guaranteed to be the best. Our shoes always give satisfaction.

The best Horse Shoes in the land bear this trademark, the stamp of quality



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COMPLETE CATALOGUE FREE Showing all Styles of our Shoes

AMERICAN HORSE SHOE COMPANY

Phillipsburg, N. J.



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See page 30 for Index to Advertisers.



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Is it not preferable to make your selection from the most complete line and the best shoes on the market?

United States Horse

"In a Class by Themselves"

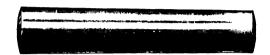
Our Illustrated Catalogue shows all sizes and patterns. The book We will gladly send a copy to your address. Write today.

We are giving away a handsome souvenir stick pin to every smith who sends his name and address. Did you get one? Don't wait until they are gone. Write today.

United States Horse Shoe Company Rolling Mills and Factory, ERIE, PA.

"MORSE" TOOLS

Drills, Reamers, Cutters, Chucks, Taps, Dies, Arbors, Counterbores, Countersinks, Gauges, Mandrels, Screw Plates, Sleeves, Sockets, Taper Pins and Wrenches.



A part of the success of motor car manufacturing lies in the accuracy of **Taper Pins** used in their construction. "Morse" **Taper Pins** are absolutely correct in regard to taper and size.

Our catalog illustrates our full line of tools. It is free to every one.

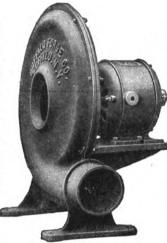
Morse Twist Drill & Machine Co. NEW BEDFORD, MASS., U. S. A.

BUFFALONEW DEPARTURE

ELECTRIC FORGE BLOWER
Requires Only 5 H. P. Motor

Economical, because it is built in 5 sizes; each size designed to give plenty of blast to fires, varying in number from 1 up.

Why blow a forge, for 2 cts. a day, which is the actual cost of current for this blower at the highest rate charged by lighting companies.



Efficient, because the scrollshaped fan case increases gradually in size as it approaches the discharge outlet, and the fan is built up with tapered, enclosed sides; allowing no churning of the air inside. Our blast gate gives perfect regulation. Write for particulars.

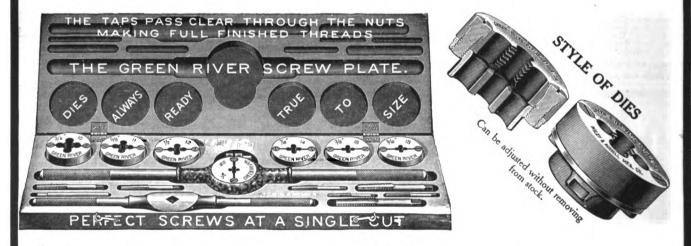
Buffalo No. 2E Electric Blower

Gives enough blast—not too much—for one Forge Fire, and at a cost of running of only 2 cts, a day. Is it folly to be wise? Is it nonsense to be up-to-date?

BUFFALO FORGE COMPANY

BUFFALO, N. Y.

The Thousands of Blacksmiths who daily use the Green River Screw Plates will testify that they are the best and most convenient sets made.



Let us send you catalogue 34D—free to all.

Sets have the Lightning Patent Drop-Forged Adjustable Tap Wrenches.

SOLE MAKERS.

WILEY & RUSSELL MFG. CO., Greenfield, Mass., U. S. A.

A FEW VALUABLE REASONS WHY

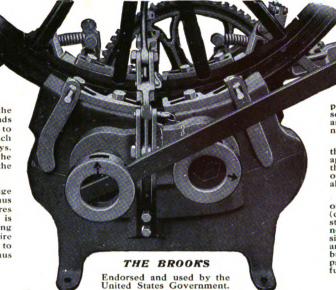
THE BROOKS COLD SETTER TIRE

IS THE BEST EDGE-GRIP COLD SETTER MADE

First-The Brooks is mechanically constructed in all its details, It is the only machine that has a key adjusting device which forces the grip keys against the tire with one movement of the hand, making them work evenly and prevents their slipping on the tire.

Second-The Brooks is the only machine with Draw-heads moving on a circle to conform to the circle of the tire, and which has machine finished guideways, thus making it impossible for the Draw-heads to raise and cause the tire to kink.

Third-The Brooks has bridge plates of different circles, thus fitting the machine closely to tires of different diameters, which is impossible with other makes using only one bridge plate, as the tire in upsetting naturally conforms to the circle of the bridge plate, thus flattening the tire.



Fourth - The Draw-heads are constructed with lateral movement, so that they may always be in alignment with the tire, thus overcoming the chance of bending the tire edgewise.

Fifth—The Grip Keys are made and hardened by our special service, without sharpening, than any other key made, and they will not break.

Sixth - The power is applied through Eccentrics. One man can apply the power to do the work that requires two or three men with other Cold Tire Setters. This alone is of importance to you.

Seventh—The Brooks is made of the best material for the purpose (consisting mostly of a high grade steel), and with proper care will not wear out in a lifetime. It is the simplest, most complete, strongest and most durable Cold Tire Setter built, and it is fully protected by our patents, and all of our machines are fully warranted.

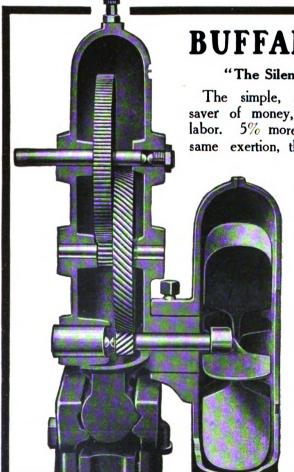
No bolts to remove from wheels; no expense for fuel; no guesswork. There are more Brooks Cold Tire Setters used today than all other makes of tire setters combined. A one-man machine. Made in different sizes. Send for illustrated Catalogue and Prices. Also vest pocket memorandum book—free to you.

THE BROOKS TIRE MACHINE COMPANY

857-859 Ellicott Square BUFFALO, N. Y.

Write to nearest office

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BUFFALO 200

"The Silent Blower"

The simple, silent, successful saver of money, time, fuel and labor. 5% more blast, with the same exertion, than that of any

other hand blower ever built.

Reasons:

Helical Gears Run in Oil Enclosed Onepiece Gear Case Large Bearings Noiseless Scroll Shaped Fan Case



Buffalo Forge Company Buffalo, N.Y.

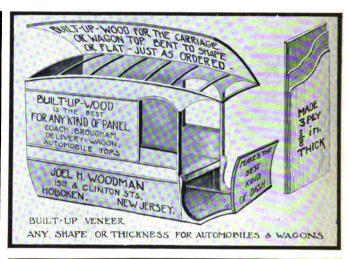
ADJUSTABLE DIES

In "Duplex" Die Stocks are instantly set by hand to exactly the size wanted, standard or over.



The dies also open when thread is cut and so avoid turning-back.

THE HART MANUFACTURING CO., 50 Wood Street, :: Cleveland, O, U.S. A.



T. E. McCOOK
PRACTICAL HORSESHOEING GENER

GENERAL BLACKSMITHING

Riceville, lowa, mar 6th 1909

Buffalo Forge 60
Gentlemen:
The Buffalo portable
"" 9 bought down draft Forge no. 660 9 fought from you a year ago is a dandy. The blower runs easier and quieter Shan any I have ever used and gives a stronger blast capable of Resp yours

See ads on pages 35 and 47.



Say! Mr. Blacksmith,

have you heard about the new tire setter called

THE SCIENTIFIC HYDRAULIC?

Blacksmiths are just wild about it where it is used, and the manufacturers are either crazy or dead sure they have a "cinch" on the other fellows for they actually warrant it to be better than any other and will let you be the judge.

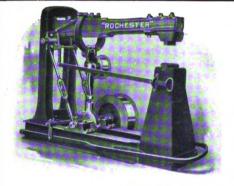
GET ONE QUICK IF YOU WANT TO KNOCK OUT YOUR COMPETITORS.

Write for information at once to

National Hydraulic Tire Setter Co.

KEOKUK, IOWA.





"Rochester"

Helve

Hammer

"The

18 ne Good

Hardest

Hitter"

For catalog address,

THE WEST TIRE SETTER CO., Rochester, N. Y.



Our Taps and Dies are the best that 34 years' experience and up-to-date methods can make them. The easiest cutting and longest wearing screw cutting tools made. Send for free catalog.

A. J. SMART MFG. CO., Greenfield, Mass.

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The Gold Medal Anvil HIGHEST AWARD

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Every genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with the best Crucible Cast Steel. Every genuine "Hay-Budden" Anvil is made by the latest improved methods.



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N.Y. U.S.A.

THE

NUMBER 9

AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

JUNE, 1909

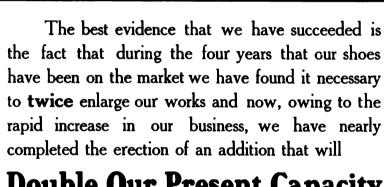
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United States Horse and Mule Shoes

AND A DETERMINATION TO PRODUCE A LINE OF SHOES SUPERIOR TO ALL OTHERS



Double Our Present Capacity

This indicates that the progressive shoers recognize the superior qualities of

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Our guarantee is back of every keg that leaves our factory.

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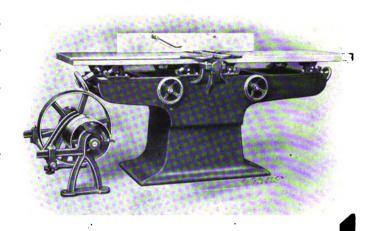




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Any manufacturer can sell you as good machines as Silver's—until you get the machine. Talk is cheap.

But Silver's machines have distinctive features not found in any others. For instance: On



Silver's Jointers or Buzz Planers

the tables slide up and down on steel inclines with split bearings, instead of on inclined slides or grooves, which cause so much trouble. There is no wear to the Silver way. It must always keep the table absolutely precise.

Movement of tables up and down, or to and from knives, controlled entirely by hand wheels shown. The same device rigidly locks tables anywhere desired. Patent applied for.

Safety Guard furnished with any size machine—8, 12, 16, 20, 24-inch.

Besides, the Jointers have every good feature of any other jointer.

These same general features of improvement apply to Silver's entire line—Band Saws, Forges, Post and Power Drills, Hub Boring and Spoke Tenoning Machines.

Send for booklet on any of the above machines, or for our 1909 Machinery catalog.

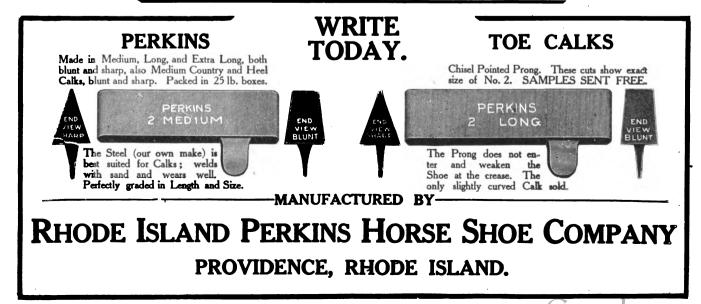
The SILVER Mfg. CO.

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Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send COMPLETE CATALOG AND SAMPLE FREE



U. S. A. Universal Wood Worker, fitted up with Jointer, Shaper and Two Side Molder.

THE AMERICAN BLACKSMITH

Universal Wood Worker, fitted up with the Single End Tenoning Attachment, with traveling table and hold down lever.

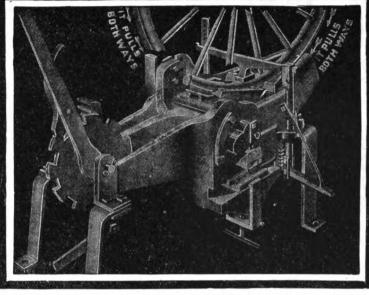


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HOT FORGED NIB **INSIST BUY** ON **FROM** "STANDARD" **YOUR** CALKS NES PERFECTIVA **DEALER** STANDARD NO. 2 LONG **FRANKLIN** Joliet, Ш. **STEEL** WELDS EASILY Cambridge, WORKS Mass. Digitized by GOOGLE

NOT ONLY THE BEST

Screw is 5 in.



BUT ALSO THE CHEAPEST

EXTEND YOUR TRADE, INCREASE YOUR PROFITS, INSTALL A HOUSE COLD TIRE SETTER IN YOUR SHOP NOW.

The HOUSE is the one to buy, and don't be deceived by big sounding ads, for some men have no regard for truth, and besides, if required, you can try ours in your shop at our expense, though your neighbor likely has one, for there are about 3,000 in use. This is the real proof, also, that ours are the best, for if others are as good they would have as many in use. They certainly advertise the biggest.

The following evidence shows why men buy ours:

The House Cold Tire Setter is a Money Maker—Before I bought one seven years ago, I was poor and working in my shop alone, but now I work 18 men and have built a good two-story brick shop. The House Cold Tire Setter is responsible for it all. It has certainly kept the clear dollars dropping into my pocket.

A. B. GARBER.

They Never Wear Out—I have used my House Cold Tire Setter constantly for 7 years, has never been out of fix, nor cost me one cent for repairs and I would not sell it for price if I could not get another.

F. H. BRIGHTBILL.

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The House Cold Tire Setter is a Trade Getter—I bought one in 1904, prior to that time I very little work, but after that I had worlds of it—for instance, I set 4,000 tires the second r and I got their other work, too, don't you forget it. I have set 117 tires in one day.

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See What Uncle Sam Says—The No. 3 House Cold Tire Setter which the Government bought in 1907 does all our work with ease. It is at once a great time and labor saver.

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We have good evidence to show that the Government has not bought nor put in any cold tire setter but ours within the last three years, there-fore, any claim to the contrary is unfair and misleading. The real season is on now, the 7 wet years are past and the 7 tire setting years are here, so there is no time to lose. Write us at once.

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Most any kind of cold tire setter will SET a tire. Some do it better than others, but

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is in a class ALL BY ITSELF for *Quality* of work, because it has the only correct *Principle*: It does really PULL both sides of the tire at the same time—Others claim to do it, but claiming is all. Then the price is reasonable. Why pay twice as much for a machine not half as good. An ironclad guarantee is on every machine. But—best of all—YOU try it before you buy it.

McConnellsburg, Pa., May 1, 1909.

I received your machine April 13th and am pleased with it, as it will do just what is claimed for it.

AMOS B. WILKINSON.

McConnellsburg, Pa., April 19, 1909. I like it better than other machines I have seen, where one head was stationary and only one moved. I am well pleased with my machine.

R. J. FLEMING.

Painesville, O., May 8, 1909. I have used your tire setting machine for two years. It does better work than the old way. The only kick is from smiths that have never tried a cold setter.

T. W. MORGAN.

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I. N. RICHEY.

Bishopville, S. C., May 8, 1909. Have used it three years. Cannot see where it is worn in the least. It makes more clear money than anything in the shop. STOUDENMIRE & Co.

Hamburg, Iowa, May 9, 1909. Your machine is the best I ever saw in the way of cold tire shrinkers and I have seen all of them.

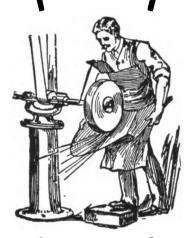
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in Diameter. Weighs 800 lbs. Every piece and part is Steel.

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A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during yourbusysesson would pay for itself in full.



"CHICAGO WHEELS SAVE TIME

They're made of stuff that cuts

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CHICAGO, U. S. A.

WHEELWRIGHTS, ATTENTION!

Wood's HOLLOW AUGER

SAVES LABOR, TIME AND MONEY.

Adjustable to desired length and diameter; made entirely of steel; adjustment easy, simple and absolutely accurate. A simple turn of the one large right and left thumb-screw makes complete adjustment for any tenon from 1/4 in, to 11/4 in, diameter, any length up to 4 inches. Made for both machine and hand use. Write for full particulars.

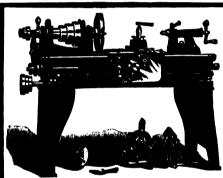
THE A. A. WOOD & SONS CO., Sole Manufacturers,
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Made from hard rolled sheet brass, one-tenth inch thick, one and one-sixteenth inch wide, with heavy gradations and figures, graduated from the end in sixteenths of an inch on one side and from the inside of the hook in sixteenths of an inch on the other, adapting them for taking correct measurements from either the outside edge of a hot piece of fron, or from the inside when held against a corner. Graduated twelve inches, have flat handles and measure over all sixteen and three-fourths inches.

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Our new 15-inch engine lathe, with all time and labor-saving improvements, heavy and substantial, a modern, practical, high-grade lathe, is the best for your shop.

It's a SEBASTIAN—a good lathe Investigate its merits-Write for Catalog.

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Made in all grades Fully guaranteed All sizes in stock

THE BOURNE-FULLER CO IRON STEEL PIG IRON COKE

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THE AMERICAN CALKING MACHINE

forms any calk on a horse shoe that a horseshoer can make with a hammer. Just heat the shoe and one pull of the lever forms the calk.



American Calking Machine Co.

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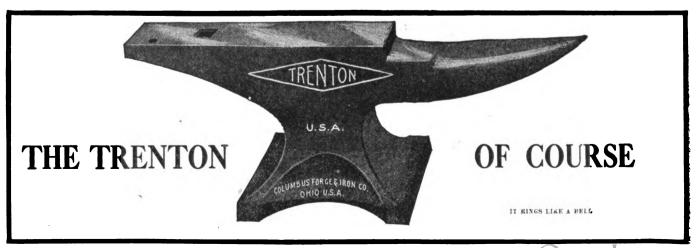
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This splendid machine only \$7.50. It is the Stewart No. 1. Send \$2 and we will ship it C.O.D. for the balance. If you are not pleased, return at our expense and get your money.

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THE DEFIANCE
MACHINE WORKS
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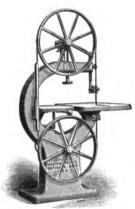
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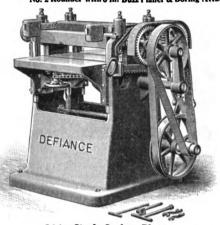


No. 2 Rounder with 6 in. Buzz Planer & Boring Attach









No. 6 Vertical Borer.

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28 in. Band Saw.

24 in. Single Surface Planer.

Eccles Ball Bearing Couplings

ALL OUR COUPLINGS ARE SHIPPED OUT WITH TWO-PIECE BUSHINGS FASTENED IN THE COUPLINGS

When Bushings are worn out by long use they can be instantly replaced and fastened into the socket by our special process.





Patented Nov. 25, 1902 Patented June 11, 1907

The spring is pivoted at the front so that it can be turned out of the way of the wrench while clipping Coupling to the axle.

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Catalog No. 15 is our Latest

We make a full line of Carriage and Wagon Forgings

RICHARD ECCLES COMPANY, Auburn, N.Y.



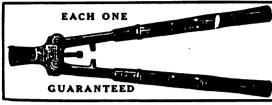
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for rolling steel and from tire for wheels to a circle of any desired diameter. It will bend tire from the lightest to 10° wide by 1° thick. Is heavy and well proportioned. Furnished with tight and loose pulleys, with friction clutch pulley, or direct connected motor, if desired at an additional charge. We also manufacture solid steel loose coilar axies and the National self-oiling tubular axies and steel stock and hog troughs.

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Manufacture and Sell-

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"ONE FIRE" Marvel. \$28.00 For 4 Light Fires, 55.00 For 4 Medium Heavy Fires, 60.00 For 4 Heavy Fires, -80.00

For 8 Heavy Fires, -

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To Fit Any Wagon Plain or Grooved Tire

Farmer's Handy Wagons

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FOR ALL LIGHT VEHICLES. USED BY LEADING MANUFACTURERS.

Made in High-Grade Malleable Iron.

No. 440B. Buggy Size, 10 in., for 11 or 1 in. Straight Bed Axles.

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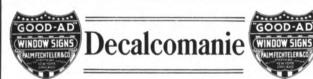
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From all directions we receive the same report that "The Capewell" nail is incomparably better in driving, holding and clinching qualities than any other nail manufactured in the world today.

Furthermore: Every nail is serviceable—there being no scrap or defective nails to pay for—and a box of "Capewell" nails will shoe more horses at much less expense than any other brand.

"You can **trust** 'The Capewell', no matter how hard the service."

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I knew the value of your nails before, but I have been trying them out these last 5 years in the hard service of the Race Track and I now think more of them than ever.

A horseshoer can get more for his money out of your nails than any nail I ever heard of. "Capewell" nails drive without a wrinkle, and it is possible to use smaller sizes than of other brands, which makes a neater job and saves money. My experience is that anyone can trust "The Capewell" nail, no matter how hard the service.

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"Tools That Wear" HELLERS' CELEBRATED AMERICAN HORSE RASPS FILES AND FARRIERS' TOOLS

will save you Time and Money. our own Production of Special R on Application.





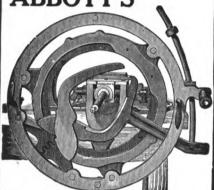
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It makes steel weld like iron. It has no equal for welding tires, axles and springs

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We make the following sizes: No. 1, 3 in wide, 14 in high " 2, 3½ " 14 " " 3, 3½ " 10 " Weight per set of 4, 16 pounds. This shows the strength of our STANDARD as compared to the old style.

The Bruce Malleable Wagon Standard

Tested thoroughly and guaranteed strictly as represented.

Note its great advantages over the old style.

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1. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.

3. The Malleable Iron Standard has a 3½ in. face at base, which prevents wear on wagon box, while the old style has only a ½-in. face.

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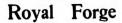
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THE FULLEST CAPACITY SOLID CONNECTIONS FULLEST CAPACITY SIMPLY CONNECTING AT A DOSESTITATE OF THE FURNISHING AT A DOSESTRITATE OF THE AND AVOIDING AT A DOSESTRITATE OF THE ADDRESS OF THE A THUS FURNISHING A SOLID CONNECTING A SOLID CONNECTI LOOK INTO IT!

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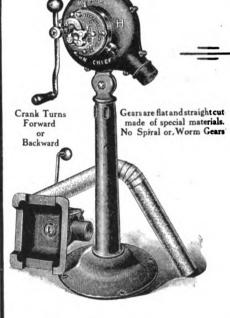
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THE BALL BEARING

A Single Steel Ball resting on a hardened Steel Disc. This contact of Ball and Disc forms a bearing in which the friction is too little to estimate. : : : :

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It is opened and closed with the hand.

No more set screws to mar and bruise the shanks of bits.

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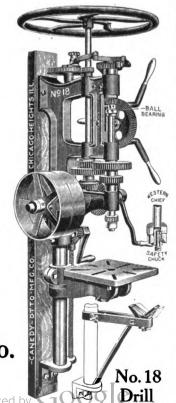
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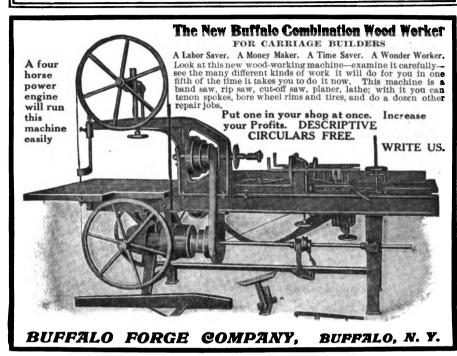
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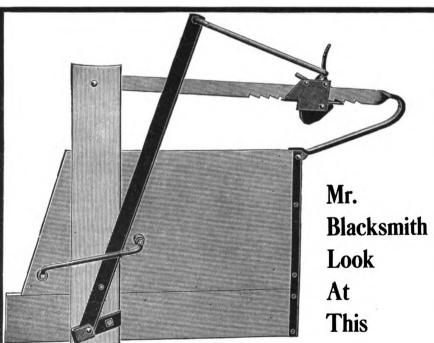
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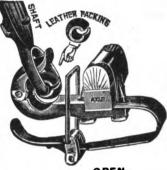
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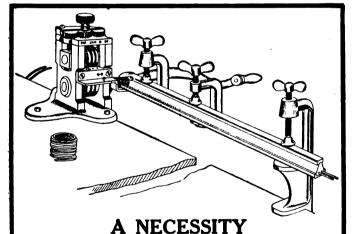
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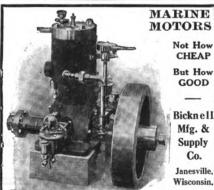
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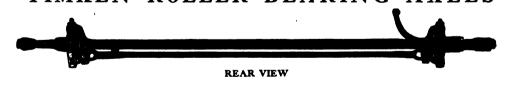
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No Time.

How often we hear a man say he has no time for this, that or the other thing. And we even hear it in connection with their craft journal. "I have no time to read." No time to read-no time to improve-to learn-to save. No time to find out what my trade is doing. No time to keep my knowledge of my trade alive and growing. No time to learn how to keep my business prosperous and growing. That's what it means. And if we dig down beneath the surface we would very likely find such men spending time where it will do them little or no good. The five or ten minutes before the whistle blows, the spare time at evening, the hundred and one other times when a man's hands are idle are the times when he can work with his brain to best advantage. No time to read is like saying: "I have no time to succeed."

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Wanted: Suggestions.

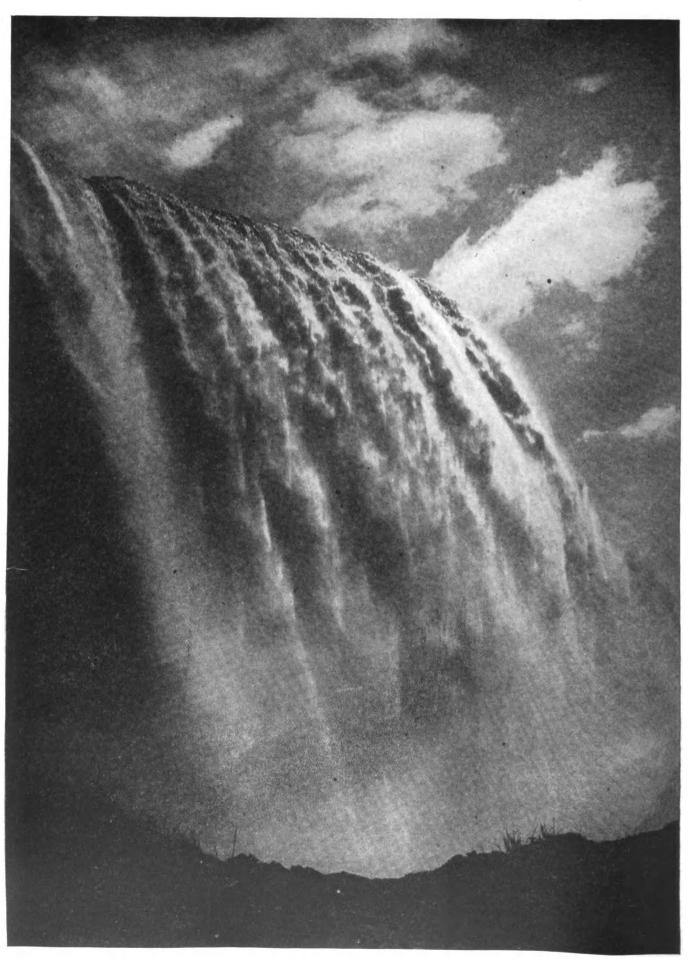
We want you to consider this personal, Mr. Reader. We mean you. Suggestions are wanted. We want you to make them. Suggestions of any kind. Suggestions for changes, improvements, any kind of suggestions at all. This is your journal and we want you to help us. Of course, we believe we have a very good journal. But we are continually working for something better. If you can tell us how to make "Our Journal' better, if you can suggest changes or improvements, let us have them. We want them. We want to make the paper better every month, and suggestions from you as to what changes to make will help us greatly. Let us have your suggestions now—today.

A Penny Saved.

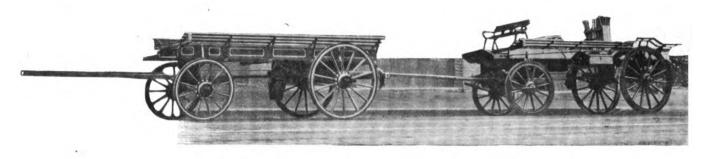
Do you look up the "Current Priees' every month? Get the habit of looking over those columns every month. Or at least see how the market is going. There is often a chance for saving told of in those two columns. One item is often likely to save you many times the subscription price of "Our Journal." These quotations are as reliable as it is possible to make them by means of a system of correspondence in the big cities. Better look to the current prices now, and make a start at looking them up every month.

Leads Them All.

Here's a letter from Ohio State that will interest you. The writer says: "I have taken several mechanical papers, but find that The American Blacksmith leads them all." It leads them all because it has the welfare of the craft at heart. Because "Our Journal" is sincere in representing the smithing craft. Because it is published for and by the craft only. Because since the beginning The American Blacksmith has considered the interest of the craft first, last and always.



THE AMERICAN FALLS AT NIAGARA. THIS VIEW FROM BELOW GIVES ONE AN IDEA OF THE FORCE, GRANDEUR AND VOLUME OF THE WATER FALLING OVER THE CLIFF



A Light Delivery Wagon

NELS PETERSON

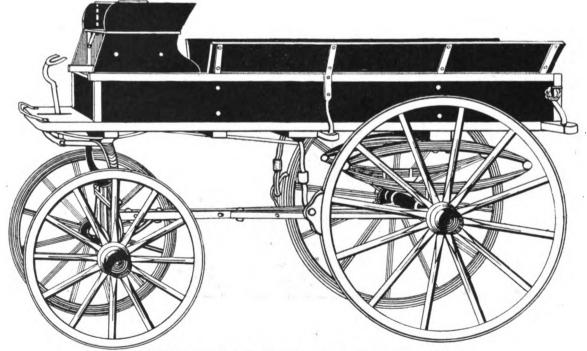


HIS light one-horse delivery wagon is suitable for grocery or butcher shop or any business where goods have to be delivered in small quantities. The construction of

this wagon is a rather simple affair, compared with some wagons built for heavy hauling, as will be noticed from an examination of the different views. The entire make-up is on straight lines and could, therefore, easily be built in any shop equipped for wagon work and at a

eight and a half by seven eighths inches thick. They are fastened to the sills by means of screws put in from the bottom. Two corner pillars are morticed into the sills at the front end. the outside corners being finished off with mouldings, as shown at A, Figs. 1 and 3. The panels are further secured by means of strap bolts on the inside and body braces on the outside. The side sills are three and a half by one and a half and project eleven inches in front of the body for the footboard. The front cross sill is three and a half by one and a half and is morticed into the side sills. Likewise, the side sills are morticed into the rear cross bar.

at A, Fig. 4, showing the rear half view. The construction of the seat is in harmony with the body. The seat risers are made of one-inch stuff, are six and a half inches high and braced from the bottom of the seat with irons one by five sixteenths inch, as shown at B, Figs. 3 and 4. The seat panels are six inches deep. The running gear is five feet three inches long, center to center of axles, with one and three eighths-inch axle behind and one and a fourth-inch axle for the front with seven inch spindles. Wheels are thirty-four and forty-eight inches high with one and a quarter inch rim and spoke and eight and one-eighth inch hub. The front spring



A ONE-HORSE WAGON THAT IS SUITABLE FOR DELIVERING LIGHT GOODS

small cost. The body is seven feet six inches long by three feet six inches wide, outside measurements, with panel

This bar is three and a half by two inches and projects five inches at the sides for the body brace, as shown

is one and a half by thirty-four inches long with six leaves; hind springs one and a half by thirty-four inches long with five leaves. It would seem now with the dimensions here given and the different views any man with a little trimming of any kind, with the exception of a cushion for the seat, the job when finished in the paint shop is enlarged and perfected system of streetcar service, in Johannesburg particularly, the demand for the higher-priced

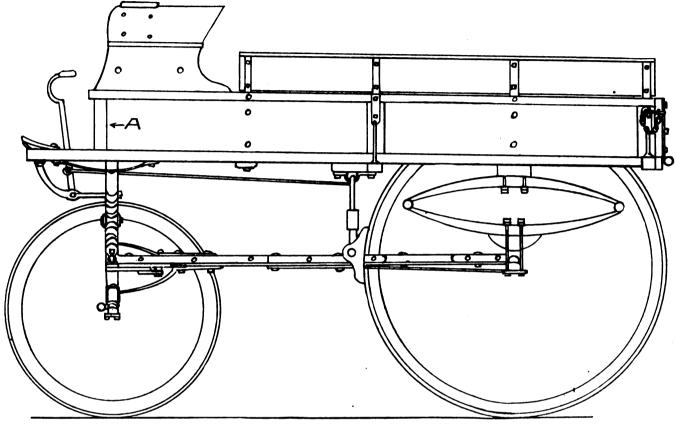
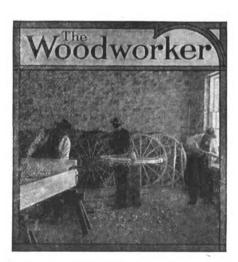


FIG. 1—SHOWING THE GENERAL LINES OF THE LIGHT DELIVERY WAGON

knowledge of wagon-making ought to be able to build one like it.

In hanging a straight-sill body on a gear of this kind, or any other kind for that matter, it is important to have the front high enough above the front wheel to prevent the body from striking when turning with a load on, otherwise the sill will be damaged and sometimes the wheel will become stuck tight and other parts of the gear will be broken in attempting to release it. For this reason a very low wheel is always used in front. The body ought to be at least six inches above the wheel when there is no load on. accomplish this it is usual to arch the front axle sufficient to bring the reach up to a level with the hind axle. In some cases the hind axle is dropped in the center to bring about the desired result, but this practice is more especially followed when a cut-under and not a straight body is used.

The painting of a wagon in a custom shop is, of course, always done to suit the taste of the customer. In this case the wagon was painted dark brown with black trimmings. The running gear was light red with black striping on wheels and gear. There being no ready for delivery. A wagon of this style can easily be made in spare time and sold for a good figure.



American Vehicles in South Africa.

"There is a good trade in buggies and carriages in the Transvaal," says Consul Edwin N. Gunsaulus, of Johannesburg. "Certain classes of American vehicles are always in demand, though with the increasing use of motor cars and the

buggies and carriages is not as great as formerly. The vehicles most in use and for which there is always a fair market consist of the extension-top surrey, carriages with front and rear seats and two-wheeled vehicles of the dogcart or trap variety. Canopy-top vehicles are not used in this country. In some classes of carriages, notably the kind in use in England, the American firms do not successfully compete in price and quality with British manufacturers. There is no reason why the American article should not have a much larger sale here than it now has. The American-built vehicle is usually much lighter. It is constructed on more attractive lines than those made elsewhere, and for use where bad roads are not encountered has many elements of popularity.

"Some makes of Canadian buggies and carriages come into competition with the United States product, and in a few instances Canadian manufacturers have quoted lower prices for apparently the same article.

"With a good grade of material and the quotation of satisfactory prices American vehicle manufacturers should find a good market for their product

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in South Africa, particularly in Johannesburg and the surrounding country. Sales to dealers here are made through some of the large American exporting houses which have local agents in the Transvaal."

Crow's-Foot Elm a Probable Substitute for American Hickory.

Consular Agent Asbury Coldwell, of Brisbane, Australia, has the following to say concerning the crow's-foot elm of Queensland, Australia, and its use as a probable substitute for hickory.

The director of forests in Queensland has urged upon carriage manufacturers the value of crow's-foot elm as a timber for use in carriage building to substitute American hickory. It may be stated that this wood is a perfect substitute for American hickory for use in wheels, shafts, poles and spokes.

The director of forests, Mr. P. Mac-Manon, supplies the following statistics:

"Crow's-foot elm is Tarrietiaar gyrodendron (Bentham). There are two varieties. One is dark in color and the other is light. The latter is found in the southern part of Queensland, where it is often called hickory, to which wood it bears a decided resemblance. The darker variety is found chiefly in North Queensland, where it occurs in great abundance, attaining a height of over

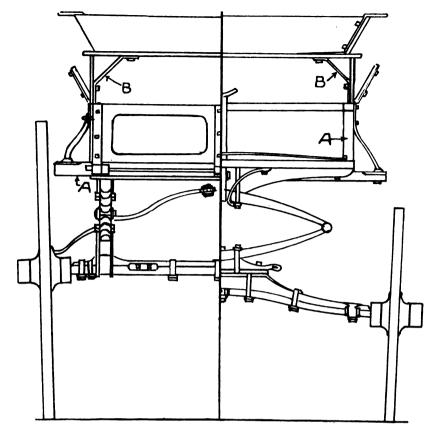


FIG. 4-REAR HALF VIEW

FIG. 3—FRONT HALF VIEW

one hundred feet, with a long, clean barrel, having a diameter of from three to five feet, and sometimes more. The dark variety is also found in South Queensland, where, though quite a large tree, it does not attain the same size, nor is it so plentiful as in the north.

"The wood of the darker variety is very beautiful when cut in the radial direction, being of a light golden ground

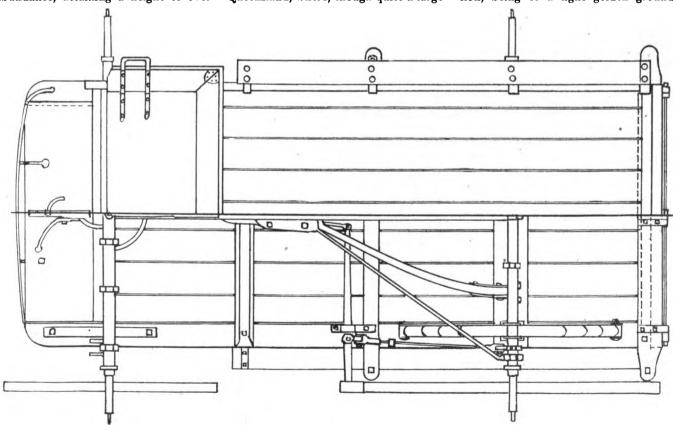


FIG. 2-HALF TOP AND HALF BOTTOM VIEWS OF THE LIGHT DELIVERY WAGON

mottled with flakes of bright brown. The color changes as the wood is held at different angles to the light. It is now being used by the government railways for railway carriage fittings, on account of the beautiful color and grain. It is extremely elastic. I have had it made into trout rods and have tested it in several ways. A carriage woodware company at Nundah is using it for spokes, and it is being made into ax and hammer handles in a factory in Cairnes, North Queensland. I have had it tested at the physical laboratory of Melbourne University, when pieces 36 inches span by 1.96 inches breadth by 1.92 inches depth broke under a load of 2,350 pounds, the modulus of rupture being 17,560 pounds. The weight per cubic foot is about 46 pounds. A piece two by two inches has held its form,

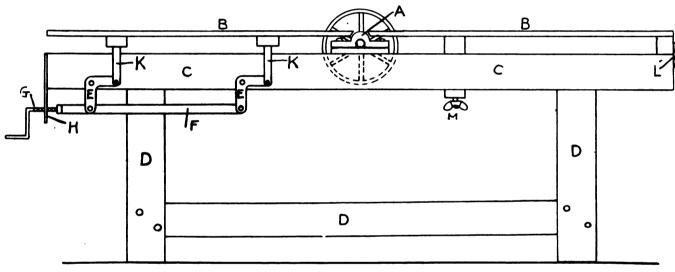
rates from Brisbane to San Francisco are \$15.81 per 1,000 superficial feet, with a minimum of \$5.84 for smallest shipment. From Brisbane to New York City the lowest quotation at this writing is \$3.65 per 100 superficial feet. The supply of this timber is said by the director of forests to be such as can scarcely be exhausted by any demands which may be made upon it for at least a generation to come.

The government railway construction works has steamed and bent some of this timber for roof sticks for carriages, but report that it cracked in the bending.

The timber is procurable in the Cairnes district in large quantities, and logs are obtainable from which planks up to 36 inches in width may be cut. The lowest quotation at Cairnes, f. o. b., is about \$2 per 100 feet in the log, and

1½ by ½ inch, bent as shown for raising the rear half of the top. The rod F joins the two arms E, E and is of 1 by ½-inch flat stock. The piece G is of ½-inch round stock, bent as shown and threaded to screw into the end piece H. The mechanism for raising and lowering the table top is duplicated on the other side of the table so as to raise the rear end of the table top evenly. The piece marked H, therefore, extends across the end of the table to the other side to receive the adjusting crank on that side.

The arms E, E are joined to the rod F and to the rods K, K by set-screws. They are fastened to the frame C by lag-screws and should work easily at each joint. The pieces K, K are short, stiff pieces of flat stock, bent to go under the cleats that run across the under side of the table top.



A PRACTICAL WOOD PLANER THAT ANY GENERAL WORKER CAN BUILD

after bending into a semicircle, for two years. 1. The ends were free. There does not seem very much to choose between the light and dark varieties, but the light is preferred by many as bearing a resemblance to hickory. I have known it to be used in a buggy pole in exceedingly rough country for eight years, replacing a pole of American hickory which broke.

"It is necessary to state that great care is required in preparing this timber. It should be felled only in winter, cut up at once, and carefully stacked with access of air to each piece. The price of the dark variety is about \$6 per 100 superficial feet sawn f. o. b. Cairnes, and the light kind about \$5.35 f. o. b. Brisbane. I could procure exact quotations if I knew about quantities, conditions, etc."

Miscellaneous Information.

The quotation for steamer freight

\$2.50 per 100 superficial feet in the wagon at the sawmill, if sawn. The district engineer for railways states that "this timber does not possess the oily nature of the spotted gum, but loses its nature when dry and becomes brittle." A large timber merchant sent a quantity to a boat builder in Melbourne for boat ribs and when steamed for that purpose it kept its shape well. A cabinetmaker uses it for making chairs and finds it very good for that purpose; he has had logs up to 87 inches in girth.

A Practical Planer Easily Made. MELVIN SUTTON.

The accompanying engraving shows a side view of an easily made woodplaner. In the engraving, A is the boxing for the planer head; B, B are the two halves of the table top; C, C, and D, D, D are timbers of the frame. The pieces E and E are of flat stock,

The other end of the table is hinged at L to allow the top to be raised at the cutters. At M the table top is held by a long bolt on each side. These bolts are run down through the table top, the cleat, the frame, and are held by a thumb nut. This end of the table top should always be on a level with the material that the knives cut.

The knives are made of good knife steel, $2\frac{1}{2}$ by $\frac{2}{3}$, and are fastened to the planer head with three set-screws. The head I made by welding $1\frac{1}{3}$ -inch round stock between two flat $1\frac{1}{2}$ by $\frac{1}{2}$ -inch pieces. I then had the flat pieces planed and the journals turned.

A Sanding Machine for the Wood Shop.

MACK C. HARNED.

This machine is thoroughly practical and combines a sanding belt and a sanding drum very conveniently. It does

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not cost a great deal and is one of the best labor-saving devices in my shop.

The frame of the machine is made of two by four-inch timber. The top and bottom of the frame, A, A, are six feet long, while the legs, B, B, are twentyfour inches long. The frame is twentysix inches wide and should be made of good, solid material and well braced.

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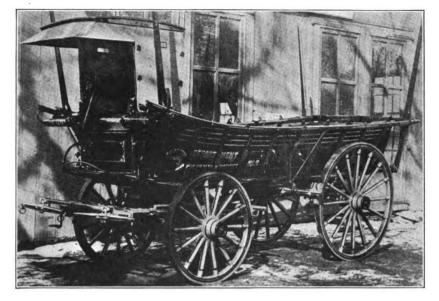
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Shop

The sanding drum on my machine was built on the fan shaft from an old discarded thresher. The drum cylinder is twenty-four by twenty-four inches in size and fastened to the shaft by means of the spiders, to which the fan was formerly attached. The drum is then turned perfectly true and a covering of two-inch square poplar put on. This cover is made by beveling the sides of the stock so as to conform to the circle of the drum. Use good glue and fasten each piece to the pieces adjoining it and nail at the ends and in the center. Leave a space about one and a half inches wide across the drum, where the paper can be fastened by means of a wedge-shaped piece, as shown at X. After the nail heads have been driven down well, turn the face of the drum true and also true the ends, being sure that one end of the drum is the same size as the other and that the center is not bulging or narrower than the ends.

When true, pad the drum with three thicknesses of saddle lining, carefully stretching it and tacking the ends and the edges evenly, leaving the opening or slot before mentioned uncovered.



A PENNSYLVANIA HAY WAGON BUILT BY BROTHER F. C. ASHTON

The cylinder or drum should balance perfectly in order to do perfect work.

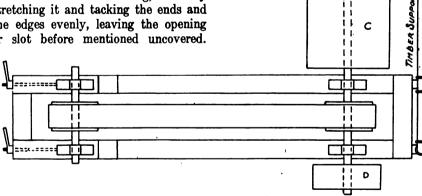
The paper may now be attached to the drum. Use number two and a half grit, twenty-four inches wide, taken from the roll. Dampen your paper before putting it on and fasten by lapping the ends into the slot opening. Now drive the wedge-shaped piece in the slot and fasten with screws, as shown at X in the engraving. When the paper dries it will be perfectly tight and the drum ready for use. On the other end of the shaft is the

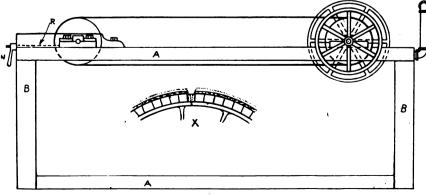
drive pulley, while between the bearings of the shaft is placed a fifteen or eighteen-inch pulley, with a three or four-inch face. On the other end of the frame is an independent shaft, carrying a pulley similar to the one between the bearings. Over these two pulleys I ran a belt made of cotton webbing, which carries the emery grit. The method of attaching the grit to the belt is as follows: Apply a liberal coat of glue to the belt with a brush and then sprinkle liberally with the emery grit. Put on all the grit the glue will take. When the belt wears smooth apply another coat of glue and more emery, and dress in this way as often as necessary until the belt gets too heavy. The belt may then be soaked, the glue scraped off and a new coat applied.

The independent shaft should have its bearings fastened in a timber about two by five inches, which should be held on the frame by cleats. These cleats should have slots cut in them to allow for ample adjustment by means of the threaded rod R and the tail nut N, by means of which the sand belt is slacked and tightened. This adjustment also allows for the use of different sized belts, which would be impossible if the independent shaft were stationary.

This machine will finish up wagon box sides, bolsters, hounds, spokes, in fact, most anything requiring a sanded surface at a minimum expenditure of hard labor. The machine should be run at between eight hundred and one thousand revolutions per minute.

This labor-saving machine can very easily be built by most any practical





AN EASILY MADE SANDING MACHINE

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wood-worker and will be found of much use on many otherwise timetaking and laborious jobs.

How to Make a Wood Planer. H. F. W. LIESEMEYER.

The accompanying engravings show a very practical shop-made planer and details of construction. The frame and legs are of two by four-inch oak, while the table top is of one and three quarters by twelve-inch oak stock. The table top is strengthened by means of two pieces of 1-inch iron, one at each side. This is necessary because the center slot cut in the table will weaken it considerably The table top is hinged at one end of the frame, while the other end is loose. Thumb screws are fitted into the end of the frame that is not attached to the top. These screws are for raising and lowering the table top for different cuts. The staple-shaped piece of iron on the bottom of the table top should fit over the cross piece in the frame at this end, so as to hold the top rigidly when the table is in use.

The knives are eight inches long and two and a half inches wide and are made of 1-inch crucible cast steel, tempered in raw linseed oil. The knives are bent at an angle as shown in the engraving at M. The spindle carrying the knives is made of 3-inch, square, soft steel, but it would no doubt be better if made a little heavier. The knives are bolted to the spindle with three bolts through slot holes, so that any adjustment can be made properly when necessary.

It may be well to point out the necessity of bracing the table frame and legs well, so as to stand the work likely to be done on this machine. The frame can hardly be made too strong.

Some Practical Hints on Wagon Repair Work.

W. G. BRECKON.

The following hints have been gleaned from an experience extending over quite a number of years and are given to the craft in the hope that they will prove of value and benefit.

In the country repair shop black is the color generally used for striping. To mix it so as to work free, take drop black and mix it as if it were going to be used as ordinary paint, then add enough heavy varnish to hold it together. It will then work freely and will not run. Yellow is also a handy striping color to have around the shop. It goes well with the gear in the red, wine color, black, green or brown.

If when setting the tire on a light wheel, you should pull it to dish, stretch the tire cold by pounding on the edge with a fuller.

To tighten the box in a wheel do not wrap the box with canvas and drive in. It is sure to get loose again. Take a piece of pine board and split off a lot of very thin wedges. Place the box in the hub, get it centered, and fill up tightly between the box and the hub with the pine wedges. When you have driven in all the pine you can, get some hard wood wedges and wedge, as you would on a new job.

Sometimes a wheel comes to the shop with the tire spiked on. To drive the cold chisel between the rim and the tire is rather hard on the former. Find where the spike is, center punch it, put the wheel under the drill and bore the spike out.

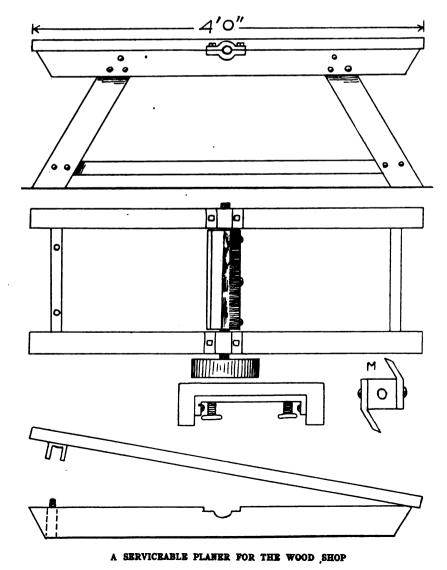
If when taking a weld on large iron the fire is dirty, take some salt and throw into it. It will clean your fire and make it burn brightly.

Wagon bolsters are generally about the same size and shape. In spare moments make up several and paint them. The paint prevents the air checking them and also if a man is in a hurry you do not have to let the job go without paint.

Suppose you wish to make a dowel. Take a square piece of wood which will make it the right size, trim it to eight faces and then round up as near as possible with the smoothing plane. Take a piece of maple, the end of an axle will do, and bore a hole in it the same size as you wish the dowel. Now drive the stick through the hole, as at A, when it will be about as round as if turned in a lathe.

If the center plates on whiffletrees are bolted on with 3-16-inch tire bolts they will not cause annoyance by becoming loose.

When replacing an old rim with a new one don't drive the old rim off, as there is danger of disturbing the spokes in the hub. It is better to split the old rim off by driving wedges into the face of the rim, as shown at B.



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Light delivery wagon wheels should be riveted each side of the spoke in the rim (C in the engraving) to prevent the tenon of the spoke from splitting it. Place the wheel on the wheel horse, face up, mark where the rivets come and bore with a screw bit, which the rivets will follow tight, and drive your rivets in. Take the wheel off the horse and screw it face down on the iron tire platform, place the burrs on, cut the rivets the right length and rivet them. Proceed with the other wheels in the same manner.

A wheel two feet six inches high, with a four-inch tire, is sometimes a trouble-some thing to rim. By putting on rims two inches higher than the wheels you will overcome a lot of that trouble, as a bent rim will pull down easier than it will pull open.

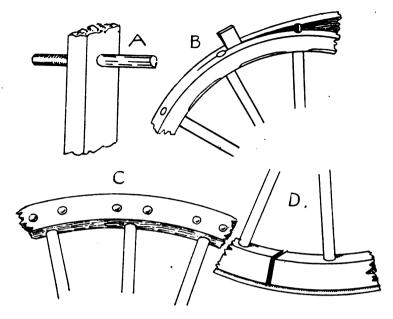
Suppose that a wheel with a fourinch tire comes to the shop to have a couple of new spokes put in. The tire is tight on the rim and you do not wish to injure the wheel. Just take an old, coarse saw and saw a piece out of the joint, D, strike a few sharp blows on the sole of the tire and you will find that your tire will come off easily.

When the bands on a hub get loose do not take them off and cut and weld them; it is unnecessary. Make a lot of thin wooden wedges. Then take a thin iron chisel and drive into the hub pretty close to the band, pull out and drive one of the wedges in its place. Do this all around the hub and the band will be as tight as necessary.

The first point in making wheels is to select good material. The second is to have the wheel proportion proper. Be sure that your hub is large enough; it should be of such a size that it will allow the spoke to be in the hub as deep as it is wide, and to allow a space of one eighth inch between the spoke and the box. If the spokes touch the box they will soon become loose.

Always use a dodged hub. It is the best because the dodged spoke acts as a brace, and also the hub is not cut away so much in one place as when mortised straight. Drive the spokes so that the wheel will have one eighth dish. When the tire is set the wheel should not pull to dish. If it does, the spokes are bent or they have moved in the hub. Be very careful in mortising the hub. First, get the feet of the spokes all on taper, about one eighth inch for heavy wheels and one sixteenth for light ones. When the mortise is made it should be exactly the same shape as the foot of the spokes, but one eighth inch smaller endways, so that it will drive tight. Of

course, you have to be guided by the material in the hub as to how tight you set the spokes to drive. Take a hamline of the axle. The wheels should also measure one half inch less in front than behind. This causes the wheel to run



SOME PRACTICAL HINTS ON WAGON REPAIR WORK

mer of suitable weight, dip the spoke in some very thin glue and drive it into the mortise. Do not drive with a wooden mallet, because you cannot drive a spoke as tight with it. Do not set the spoke too tight, for when it is driven it will cause a shoulder to form on the back edge, which will allow the wheel to pull to dish and the spokes will not remain tight. The next move is to cut the spokes off the required length.

When cutting the tenon on the spoke do not cut it straight with the spoke, for if you do when the rim is put on the joints will be hollow. Always cut the tenon a little back of, but straight across, the wheel. This will cause the joints to be high, so that when the wheel is screwed down on the platform it will bring the face of the wheel level. When the tenon is cut on the spoke, take a chisel and cut a shaving off the top and bottom. This will prevent it from splitting the rim. There should be a wedge driven in the tenon after the rim is on, to get it up to the shoulder of the spokes so as to enable the workman to cut the correct joint.

Axles have caused a great deal of trouble to a number of workmen. When the principle is understood the laying out of axles is very simple. A wagon axle when set right, without a load on, should measure three eighths inch less at ground than at the hub. When the wagon is loaded the wheels spread and are then on a plumb spoke, or in other words, the front spoke (if the spokes are dodged) will be square with the center

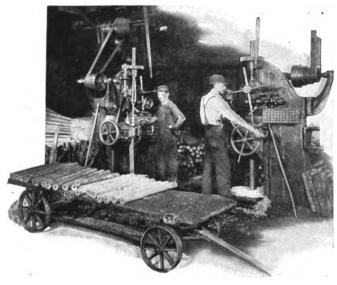
up to the shoulder all the time and takes the strain off the nut. This is called the gather of an axle. If it is gathered too much it will cause the wagon to run hard. Some people have a notion that if a wagon talks loud it runs easier, but this is not the case.

To proceed to lay out an axle, take one side and edge up square and straight. Draw a line up one quarter from the bottom of the axle. Find the center endways, which is two feet nine inches when the track is four feet eight inches, the axle piece being cut off five feet six inches long. From the center measure half the width of the track, and from this point measure back the distance it is from the front of the front spoke to the back of the hub. This shows where the shoulder comes. Now, from the bottom line at the shoulder mark place half the size of the arm. Do the same at each shoulder; then draw a straight line the length of the axle through these marks. This is the center line. Now, from the center line at the length of the arm from the shoulder measure three sixteenths of an inch down. This will cause the axle to be set right if the wheels had no dish. But wheels having dish find out how much by placing a straight edge across the wheel and measuring how far it is from the spoke to the straight-edge at the hub. Now. take half of this and add to the three sixteenths already mentioned, and place down from the center line and this will give the correct pitch. Find the size of the arm inside and mark it on the axle,

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not using the center line, but the line that is drawn from it. For the gather go one eighth inch forward of the center and this will give about the right round bars. These bars vary in diameter according to the size tubing to be made. From six inches down as small as two and a half inches. After

piercing. At the heating furnace the centered billets are fed on to the inclined furnace bottom and roll by gravity from the upper and cooler



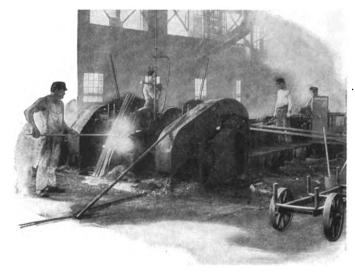


FIG. 1—CENTERING BILLETS BEFORE HEATING FOR PIERCING MILL

FIG. 2—HEATED BILLETS ENTERING PIRRCING MILL

amounts. If both wheels have not the same dish it will be necessary to lay them out separately. The foregoing is for new work where the two axles are put in at once. Of course, for repair work the axle should be set so as to track with the other one. If you have only one brought to the shop take the pitch of the broken one as near as possible and make the new one the same. If the whole of the wagon is brought to the shop, you may set the axle the same as for new work, except for allowing the new axle to be longer between the shoulder than the other one, thus making it track right.

Making Seamless Tubes of Steel.

It is hard for the uninitiated to believe that a steel tube can be picked up cold from the floor and passed in a minute's time through the dies of a draw-bench and be reduced both in diameter and thickness. Yet that is what happens where Shelby-steel tubes are made. They are drawn cold.

But let us tell the story from the beginning. Let us follow the bar of steel from the time it is received at the rolling mill to the time it is ready for the bicycle, the automobile, the boiler and the thousand and one other uses to which it is put.

The steel is received in the shape of blooms, seven inches square, about six feet long and weighing about seven hundred and fifty pounds each. These blooms go first to a heating furnace and are then rolled from square to rolling, the bars are cut to lengths of about ten feet for convenience in handling.

After cutting to working lengths the steel is known as a billet. It may be from one to five feet in length, but must contain as many cubic inches of steel as the finished tube plus enough to cover the losses incidental to manufacture.

It is important that the piercing point strike the exact center of the solid billet, for if it does not the tube will be thicker on one side than on

end to the lower end where the temperature is high enough to render the steel soft and semi-plastic. The heated billet is now fed into the piercing mill, Fig. 2, where the centered end is forced upon a malleable iron piercing point by heavy revolving disks. The operation of piercing is accompanied only by a dull, grinding sound. There is not much suggestion as to the enormous power necessary to displace the hot metal from the center toward the outer edge of the billet. (See Fig. 3.) The pierced billet is now about twice

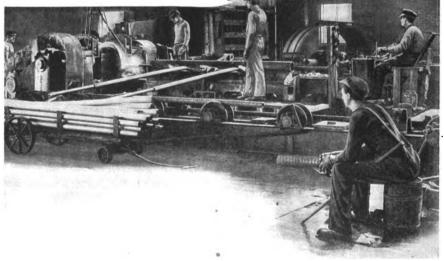


FIG. 3-PIERCED BILLET COMING OUT FROM DISKS OVER MANDREL ROD

the other. To insure the billet being pierced in the exact center, each one is drilled, see Fig. 1, before it passes to the heating furnace preparatory to its 'original length, and before going through the drawing process it is cut in two. The saw, Fig. 4, makes short work of this operation; a shower of

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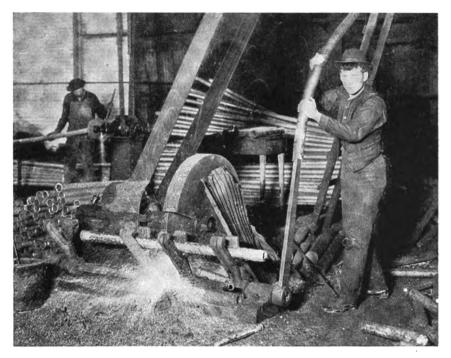


FIG. 4.—SAWING THE PIERCED BILLETS

sparks, a ringing noise and the pierced billet is in two pieces.

The pierced billet is not yet the smooth, evenly drawn tube that you find in your bicycle or automobile. It is a rather rough, thick-walled, scaly, seamless tube. It is raw in appearance, not particularly true to size and the marks of the piercing disks are very apparent on its surface. But it is, nevertheless, without seam or weld. To smooth the surface of the tube and to change some of its thickness into length it is now heated and then passed through the rolls and on to a mandrel, whose point is held between the rolls, Fig. 5.

The tube is now prepared for the cold-drawing operation. It is taken to the steam hammer and pointed, Fig. 6. Then it is cleaned and freed of all scale by immersing in an acid bath.

The tube is then taken to the drawbenches, Fig. 7. Here a mandrel is shoved into the open end of the tube until it touches the opposite end. The pointed end of the tube, with the mandrel inside, is then passed into the die of the draw-bench and the point gripped by the drawing pliers. The mandrel is kept in position by a long bar which goes inside the tube and holds the mandrel just even with the die while the tube is drawn.

It requires from two to twenty passes through dies of varying diameter to produce a tube of the required dimensions, and as the drawing operations harden the metal it is necessary to anneal every tube before it can be drawn. Beside annealing each tube before each drawing operation it must also be pickled, to remove the scale which is formed by annealing.

The points of the tubes remain until after the final anneal, when the tubes pass to the cutting-off machines and from there they are taken to the shipping or stock rooms.

The variety of sizes, shapes and dimensions of Shelby seamless steel tubing is shown in Fig. 8. Its uses range from baby carriages to battle ships, from axles to air ships, and from wheel

rims to walking canes. In short, its uses are almost innumerable.

The Apprentice Question-4.

DAYTON O. SHAW.

Manufacturing and all kinds of repair work could be done at a shop of this kind and then divide this property into shares and let every smith become a shareholder. There might not be much dividend at first, but the shares could be sold at par value. If there could not be enough shares sold in one association, let counties unite to cover enough the cost. While each county makes its own by-laws and prices, let them be one in this project. I think a large supply house might also be added, then the association could get their goods quickly and at a reduction. I would recommend further that the student be given a chance to work and pay his tuition. It seems to me also that it would be well to have a special course for the smith who had only partly learned his trade. Now, would not a scheme like this help the smith and bring the trade to a standing that is second to none?

Again, the student who has learned all kinds of work will know which he likes the best and can make that kind a specialty. He will be able to do all kinds of work, but in one he will be at his best. Then the manufacturer who wants an expert won't have to

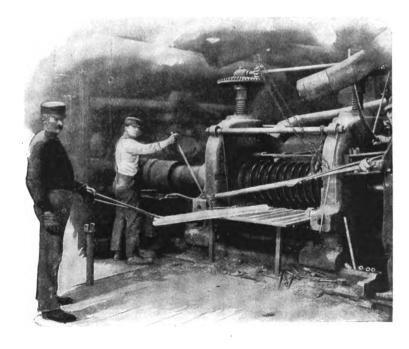


FIG. 5—ROLLING TUBES HOT AFTER THE PIERCING OPERATION

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send to the Old Country to find one. The condition of things has become so alarming that the attention of eminent men has been called to this fact. With your permission I will quote from some items I have at hand:

"The underlying purpose which gave birth to this National Society for the Promotion of Industrial Education," said Dr. Henry S. Pritchett, President of the Carnegie Foundation for the Advancement of Teaching, in his address as President of the Society at its last annual meeting, "is the thought that every nation must make each of its citizens an effective economic unit, and then must bring these units into efficient organization. We, in America, today are not doing this. We are



FIG. 6-POINTING THE TUBES

behind. In the City of Berlin, of the boys between fourteen and sixteen,

fifty-five per cent are in continuation schools learning to become effective economic units in those trades which minister to the city's welfare; in the City of Chicago not one tenth of one per cent are being so prepared. Part of the mission of our Society is to bring to the attention of our national life, of our people, this realization of our shortcomings. But there must also be constructive work. We must have

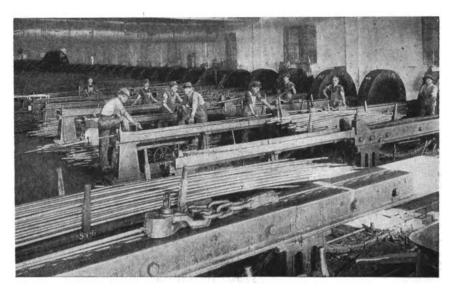


FIG. 7-PORTION OF COLD-DRAWING BENCH ROOM

definite, practical trade schools, schools that are going to train these boys and girls into definite, skilled workers. It is the hope that within the next year or two this Society, by a committee of its members most familiar with the subject, will be able to recommend to a municipality a model type of trade school; the kind of school which that particular community may well promote and encourage."

James W. Van Cleave, president of the Buck Stove Range Company of St. Louis and head of the National Association of Manfacturers, is deeply interested in the movement for industrial education and expressed his views in an address at the annual meeting of the National Society for the Promotion of Industrial Education when he said: "Our industries have a volume and a variety far beyond anything seen in any other country; they are expanding at a ratio not approached elsewhere. In 1905 our manufacturers had doubled the number of wage-earners which we had in 1880; they worked up nearly three times the value of the products and received nearly three times the wages of the earlier years. A very large proportion of the country's vast increase in wealth and prosperity in the past quarter of a century has been contributed by the manufacturers in their various and rapidly broadened list of the mechanic arts and appliances.

"The number of industrial schools which have been created during this period is small compared with the needs of the country. While states, cities and individuals have contributed scores of millions of dollars in the past decade or two to the creation of general schools and colleges and to the establishment of libraries, only a trivial amount has been expended on the education of those

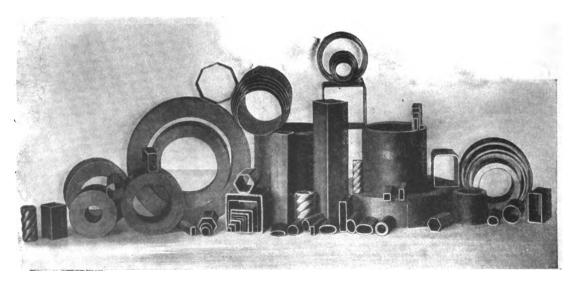


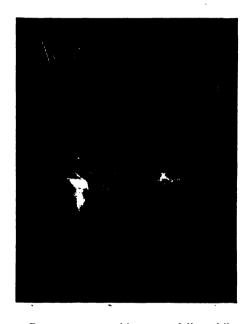
FIG. 8—GROUP OF SIZES AND SHAPES OF SHELBY SEAMLESS STEEL TUBING

hands and eyes which have contributed the larger portion of the country's growth in wealth and general prosperity.

"The demand for industrial education for our boys is asserting itself in a compelling way and in recent years attempts have been made to meet it. The Winona Technical Institute of Indianapolis has established departments in which practical mechanics in several trades are graduated, and other institutions are doing a similar work.

"But these efforts are too miscellaneous, too isolated, too haphazard. They lack uniformity, comprehensiveness, coherency."

(To be continued.)



Benton was smoking peacefully while the Editor examined photographs. Picking out an old one the Editor exclaimed; "Old Man Harvey, as sure as fate!" Then turning to Benton he continued, "He was the village smith down our way. That was some years ago—before they had any large business places and when the main attraction was the arrival and departure of the two trains that stopped mostly for drummers and fakers. But I'm ahead of my story." And the Editor swung around in his chair, held the photograph at arm's length for a minute and then told this story:

"It was back in my barefoot days. I remember Uncle Hank's smithy just across from the postoffice. Everybody in town called him Uncle Hank, he was so old or seemed so at least—I believe he was there when the town started. He occupied an old-fashioned, solidly-built brick shop that had withstood the years well. His shop interior needs no description. You'll find it the same as any other of a class of smith shops that is now rapidly disappearing.

"Here Hank Harvey carried on his trade of blacksmithing. He did everything from soldering holes in dishpans to the repairing of clocks and from little welding jobs to horseshoeing and plow repairing. His side lines were too numerous to mention, but perhaps the most important to the villagers was his willingness to tell the news. And he knew all that was going on. He knew everybody within miles around by their first name. Then, too, he was a veritable library of useful information. When anybody wanted to know something about anything, Uncle Hank knew it, if anybody did. Here for many years he hammered away on his anvil, tinkered at his bench, looked across at the postoffice and dispensed the news of the day.

"Then one day somebody struck oil and the town boomed and the blacksmith business improved. Land sold at enormous figures. Strangers came, farms were sold, homesteads razed, but the smith hammered on his anvil, tinkered at his bench, looked across at the postoffice and dispensed the news of the day.

"After the first sprint, things went along at a more conservative gait. The town continued to grow, but along more substantial lines. Old buildings were sold and new ones put up in their places. More strangers came, some established themselves in business and some prospered. But the hammering still continued and so did the tinkering and the looking across at the postoffice and the dispensing of the news.

"Then one day came a business man who knew the value of the lot upon which the smithy stood. He offered half what it was worth, but the hammering continued and so did the tinkering and the looking across at the postoffice and the dispensing of the news.

"The offer was raised to three fourths the value of the property, but the smith kept a-hammering.

"Then the business man placed the matter in the hands of a real estate man. He flattered, jollied and coaxed. He made offer upon offer. But the sound of the anvil continued.

"Then someone suggested calling upon the wife. The business man went himself. He flattered, jollied and coaxed. He made an offer—'the smith's wife would talk it over with the smith.'

"The hammering stopped—and so did the tinkering at the bench, the looking across at the postoffice and the dispensing of the daily news. Some said the old shop had been sold for a price never before heard of in the town.

"The smith was silent now. His anvil and hammer gone he seemed also to have lost his speech, except for saying 'Hullo' in his short, curt way. For two mornings after the shop was sold he came down at the regular working hour, only to walk slowly back up the hill with head bowed.

"The third morning found him at the postoffice door, dressed in his meeting clothes. He said something to the post-master and a chair was placed on the walk for him. Here he sat till noon, always looking across at the shop. After dinner he returned. From that day the chair on the walk was known as 'Old Hank's Chair,' and when not eating or sleeping Old Hank was in it—always looking across at the old shop.

"Some said the reason the shop was not torn down was because most of the business man's money went to the purchase of the shop. They said he had to get more before he could pull down the shop and build. At any rate it was some weeks before they touched a timber of the old place. In the meantime the smith was silent, sat before the postoffice and looked across at the old shop.

"The old man seemed to age quickly after the shop was sold. He had never walked especially brisk, but now his gait was slow and even shuffling. One day he came with a cane. It was of hickory, polished like glass with a head of copper that shone like gold. Some said he had made it in the early days when tinkering at the bench. He complained of rheumatism now when they inquired for his health. But the chair was still before the post-office and he was there too, always looking across at the old shop.

"Then one morning a gang of men came, with teams and picks and shovels. The old man couldn't seem to understand it. He watched them open the shop and take away his old anvil, the old bellows and his bench where he had tinkered. Finally he tottered across the street to have one last look at the shop interior. The sight of the demolished forge and the insides literally torn out of the old shop must have been a shock, for he had no sooner entered the doorway when he swayed unsteadily and fell forward upon his face. The workmen soon had him back in his chair, and willing and gentle hands washed the cut over his eye and the gash on his chin. It took them three days to raze the old shop. But the smith came down every morning, sat in his chair before the postoffice and looked across at the old shop.

"The last day, the old man was assisted to his chair by one of his boys, a strong, bright young fellow as straight as a hickory spoke and as strong. All that remained of the shop was the front wall. This they intended to pull over. The old smith looked long and steadily at the old shop front, the name painted on the bricks over the door and the great horseshoe, now barely discernible higher up on the wall, and the tears came to his eyes. The men attempted to pull the wall down, but it was not made to stand for a day or a year. After two or three ineffectual attempts they gave up. And the old smith across at the postoffice seemed to smile and his eyes twinkled. He said something about 'a shop being built to stay built,' and continued to look across at what remained of the old shop.

"The workmen, however, were determined and after shifting their ropes to better advantage the wall was brought down with a mighty noise. The old man's smile faded, the twinkle in his eye went out and his whole body seemed to wither and droop. When the bystanders recovered from the excitement of seeing the last wall of the old shop fall they found the old man in his chair—dead. His hammering had stopped forever. No more tinkering at the bench, looking across at the post-office or dispensing of the news of the day. He went with the going of his shop."

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A Smith We Know.

BY W. O. B.

He'll talk about the tariff,
He'll speak of income tax,
He'll tell you that our Congress
And Uncle Joe are lax.
He'll preach about the railroads
He'll preach about the trust,
Yet he is unacquainted
With his own anvil dust.

He'll tell you that the country
Is going to the dogs,
And that our dear old U. S. A.
Is ruled by "money hogs."
He says our dear big "smiling" Bill
Is but a "Figger Head,"
And yet his shop for smithing
Appears as if 'twere dead.

He'll call upon "The System,"
And hammer Standard Oil,
And then he'll preach for hours
About "Japs on our soil."
"The Panama Canal," says he,
"Is built upon a steal."
And yet he cannot tell you how
To set a wagon wheel.

He'll rave about expenses
For battleships and fleets,
And tell you that the army
Reminds him more of beets.
"That big, long trip was costly,
Was foolish and a frost.''
And still he cannot tell you
What a set of horseshoes cost.

He's versed upon great problems,
He knows an awful lot.
He almost knows the very date
When things will go to pot.
He knows the regulations,
Rate laws, rules and things,
And yet he doesn't know just how
To figure stock for rings.

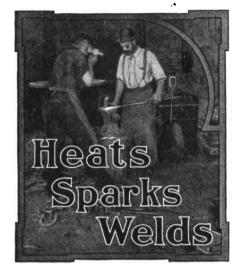




He's wise, you can't deny it,
He knows an awful heap,
About just what a man should do
A fortune big to reap.
But when it comes to "doing,"
Instead of talking talks,
He's generally out fishing,
Not forging shoes or calks.

He's known about the country,
Abroad they've heard his name.
In town he is the victim
Of every goldbrick game.
And when his name is mentioned
You really must admit
That all these little verses,
Tom Tardy surely fit.

Written expressly for THE AMERICAN BLACKSMITH.



The mind, not years, is the true measure of age.

An English blacksmith, 'tis said, invented the safety pin.

The camel, it is said, can carry a load twice the weight of a horse's capacity.

A shopful of cheerful workers is not made so by workers full of "liquid cheer."

If a man used water color "to paint a town red" he would feel better the next morning.

Perhaps a sledge built on the lines of a baseball bat would solve the apprentice problem.

The man behind the gun would never have had the gun if it weren't for the man behind the anvil.

Solve your smithing problems by sending a request for association plans to the Secretary today.

The work a horse may stand can be increased or decreased by treatment, feeding and shoeing.

Sleep is a mighty fine thing at the right time. Get your full allowance, but don't neglect business to do so.

Some men exceed the speed limit without an automobile. They usually pay their fines to the doctor.

'Tis said that the deepest bore ever made for coal was to a depth of over five thousand five hundred feet.

Modern machines take much of the drudgery out of smith work. Proper tools will free your slavery.

Business is a lemonade—the customers supply the lemons, the business man the sugar and the capitalists pour in the water.

'Tis said that the large mail-order houses will place an army of men in the field to "talk up' catalogue purchasing direct to the people.

Plymouth, Massachusetts, announces the conversion of the first smithy of New England, built in 1684, into a modern quick-lunch room.

Ever notice, the hen never cackles while she's laying an egg? She pays strict attention to one thing at a time in order to do them all well.

The smith who pays so much attention to his own business that he hasn't time to watch his competitor is most likely to worry his competitor.

True economy is the saving of that which you get for the money you spend. True economy is caring for tools, not doing without them when needed.

"Close buying, selling at a fair figure and collecting every cent when due, will spell success for every business man practicing these rules," says Thornton.

Remember, sometimes the customer is right. When he is, tell him so. 'Twill win more trade than stubborn insistence upon your side of the matter.

How the shoer despises a bad-tempered horse! Yet some will use a hammer or rasp wrongly on an animal and never give a thought to their own temper.

Cutting the price never did, never will and never can be made to pay. If it did pay why do associations and organizations strive so hard to uphold prices?

A Japanese steamship recently went from Yokohama to Seattle, a trip of over four thousand miles, and was in constant communication by wireless with one shore or the other.

Did you ever go into a drug store and notice the side lines the druggist carries? His side lines are big profit makers. If it pays the druggist it'll pay you. What is your side line?

Tuck away something for the rainy day. If but a mere trifle each day or week put something by. Once started, you'll find saving easy. And then, too, a little saving encourages more.

John Hogan says: "When a man expects me to turn part of my profits over to him for bringing his horses to my shop I show him the door—but feel mighty sorry for his poor beasts."

Shout from the housetops, if necessary, but make some effort to increase your business. Advertise some point in which you excel your competitors. Keep persistently at it and success must be your reward.

It may be possible to run a smithing business without The American Blacksmith, but the man who reads "Our Journal" and follows its teachings is more likely to succeed and not so liable to make mistakes.

Men may write mottoes, slogans, poems and stories to fill a hundred volumes, yet how much nearer to solving the problem of success does the practical journal come, by telling the worker the how, the why and the wherefore!

Finishing a shoe complete with calks, toe clip and nail holes in two heats is said to be the stunt of a certain German smith in New York City. And a certain former jockey has five hundred dollars that says the smith can do it.

A good blacksmith and wood worker will find an opportunity awaiting him if he will communicate with Mr. W. H. Smith, R. F. D. 5, Brookfield, Mo. Mr. Smith has a well-equipped power shop, but desires the help of a good, general smith, preferably married.

'Tis a good idea to keep the tags and tickets which come with your grinding wheels. When you want a new one you can get just exactly what you had, and when

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complaining about a wheel your case will get better attention if the number of the wheel or style is given.

Running a shop without regard to running expenses will soon run a business into the ground. Thirty or forty cents plus buying price does not equal a tru selling price. True expense must be covered in figuring production cost. If you don't know your costs you can't know profits, losses or anything else about your business.

American Association of Blacksmiths and Horseshoers.

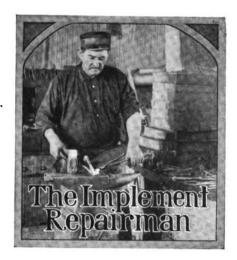
Smiths generally realize the many advantages of organization, but hesitate to start a movement in their localities for fear that neighbor-smiths will not take hold and coöperate. Of course, the greatest benefits are realized when every smith in the county is in the organization, but because one or two smiths do not realize the benefits to be had you need not stop. The chances are, such men are simply waiting for someone to make a good start. Don't wait for your neighbor. Make the start yourself. He will soon "come in" when he sees the advantage to be gained by joining hands with you.

As a rule, the man who will not join an association is one whose work is not up to standard and who depends upon cut prices to keep him going. He is usually a poor workman, with poor tools and equipment, who will do work for most any price. He doesn't as a general thing control much trade and is, therefore, not to be very seriously considered.

But sitting quietly in the shop or reading these articles every month won't alone give you better prices or form an association in your county. It requires action—good, prompt, vigorous action. Coöperation with your brothersmiths. A postal card request to me for association plans—then vigorous action on your part, assistance from me—and a strong, growing association will soon result; and the cost to you is the penny for the post card. Surely the result is worth it; surely you can spare that for better prices, harmony and improved craft conditions.

Now is an excellent time to start this movement in your county. Smiths are better able to go to a meeting now than when the roads are buried under snowdrifts. Send today for my easy plans. Address a post card now to me, at P. O. Box 974, Buffalo, N. Y. It will take you but a minute, cost but a penny, and by return mail you will receive my

easy plans for forming branch associations. Will I hear from you today? THE SECRETARY.



Gun and Novelty Repairing-6. *

Work on Shotgun Barrels.

The barrels of cheap shotguns are made of decarbonized steel that is soft and tough, similar to rifle barrels. The high-grade barrels are made with the Damascus twist or Laminated twist and made from a high grade of iron and steel combined.

The cheap grades of shotgun barrels are made similar to rifle barrels. They are of plain decarbonized steel. After being rolled out they are bored and turned up in a lathe and finally finished inside and outside. The workmanship is not of a very high grade.

The Damascus twist is made by

If two such sections are welded together it is called two blade. If only one such section, it is called Laminated twist. After welding they are wound around a mandrel and then the edges are again welded as shown in Fig. 1, making a thoroughly welded barrel, giving them that beautiful twist as shown on highly finished barrels of high-grade work. They are made in foreign countries and it takes years of practice and a great deal of skill to become able to do such work. There are several other methods of making high-grade work, but we will not attempt to describe them here. All shotgun barrels are made to certain standard sizes known as the gauge. They are as follows: eight, ten, eleven, twelve, fourteen, sixteen and twenty.

For cutting out the chambers for the cartridges and recessing for the rim of the cartridges, the same kind of tools are used as for rifle barrels, only they are made larger to correspond to the different gauges.

For making and finishing the breech pin for muzzle-loading shotgun barrels use the same kind of tools as for rifle barrels, only they are made larger to suit different sizes of guns. By choke boring is meant that the bore is made smaller at muzzle than at breech, as shown in engraving Fig. 2. When the bore is the same size at muzzle as at breech it is known as a cylinder bore.

To make a choke-boring tool, commence by turning up the body of the tool out of machine steel or Norway iron about five inches long and the

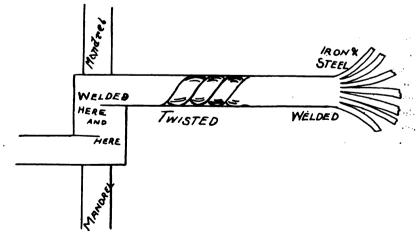


FIG. 1-HOW THE DAMASCUS TWIST IS MADE

alternating thin strips of high grade iron and steel about three eighths inch wide and then welding them together and then twisting them and again welding three such sections together. This is called Damascus twist or three blade.

*Copyrighted 1908 by W. G. Mumma

exact size of gauge of gun. Drill a quarter inch hole in the center the entire length of the piece. It is best to drill the hole before turning, as a more exact job can be had. In one end enlarge the hole and thread it for about one inch and fit the rod to

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it. In the other end fit a setscrew so that the cutters can be adjusted in or out by it, so as to fit the bore of gun, in order that the desired amount of the barrel. Don't try to move much at once or at one time, take very light cuts at a time and repeat the operation until the work is finished. Pull up

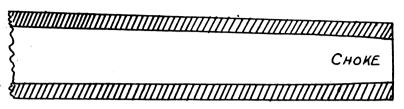


FIG. 2.—SECTION OF CHOKE BORE

of cut can be had. Saw and file slots for the cutters to work in. The cutters should be about three thirty-seconds of an inch in thickness, and about two inches long. They should be fitted to the body so that the cutting edge will work about half way between the ends of the body of the tool. One end of the cutters should be fastened with small screws, at the rod end of body. The other end of the cutters should rest against the setscrew, so that they can be moved in or out. The cutting edge of the cutters should be filed on a bevel, so as to make a good cutting edge and slightly round from end to end, so that the corners or ends will not cut or dig into the barrel. Be careful to have no nicks in the edges of the cutters, have them perfectly straight, so as not to form any rings in the barrel. They should also be very sharp. There should be two cutters, placed exactly opposite to each other and they should be well hardened. The tool is now ready for use. Proceed by putting the tool in the barrel from breech end and work to muzzle to see that it works all right. Then pull back and tighten up slightly and turn the tool slowly, also feeding slowly. Cut a very thin chip the full length of barrel, using plenty of soapsuds. Clamp the barrel in a bucket filled about two thirds full of soap suds, so as to have plenty on tool or it will get hot and tear chunks out

slightly on rod, and let tool back once in a while, now flow water through and examine work. See what the tool is doing. If work is done carefully



A FIVE-LEGGED HORSE

The animal is owned by Mr. W. H. Wood of Shirley, Indiana, is 9 years old, broke both single and double and weighs 1100 pounds. The fifth leg is a well-formed natural hind leg 2½ feet long growing out between the ears. The hoof on this leg has been shed three times.

and properly the barrel will have a nice polished surface inside with the proper amount of choke at muzzle.

Another way is to use the tool from the muzzle to breech, using a pull stroke.

Pass the tool through barrel from breech to muzzle, clear out (using plenty of soapsuds). When about one half inch from muzzle end spread the cutters so as to cut the desired amount and start cutting, pulling toward you and take a very fine shaving Repeat until finished.

To prevent a sharp corner at the choke at the muzzle use a square piece of steel about %-inch square, filed up with sharp corners with a taper at one end backed up with wood at one side. Fasten this to a rod with a limber joint, then turn it around in barrel and it will make a taper choke at muzzle. Use plenty of soapsuds, and in no case use oil.

(To be continued.)

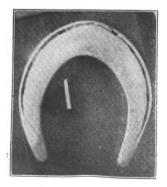
Blacksmithing at the Workingmen's College, Melbourne, Australia.

The teaching of students in blacksmithing at this college is arranged in the most comprehensive manner. In addition to obtaining instruction in varied practical work the student receives a systematic and efficient training in theory, sufficient to enable him to estimate quantities and to conduct his business in the most economical manner.

On entering the class the student works through a course of practical exercises, which require him to bend, twist, punch and weld wrought iron and mild steel, forge and temper the simplest tools of the trade and perform elementary work at the steam hammer. Concurrently with the above he is taught to calculate simple problems appertaining to the work he is doing in practice.

On passing through the first grade the student has the privilege of choosing the particular branch of the trade he desires to follow, which includes agricultural, engineering, coach and ornamental black-

smithing.



A ROLLING MOTION SHOE



SHOE WITH SHORT ROLL



A WELL-SHAPED BAR SHOE



A SPECIAL DOUBLE HALF BAR

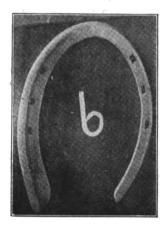
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Anyone paying a visit to the college can see a great variety of work which has been done by students. The class was established over seven years ago, opening with thirty-three night students, which number gradually increased until all the forges were fully occupied every evening in the week. In fact, there are always more applications for



FOR CORNS
AND
QUARTER
CRACK

admission than can be accommodated; the average number of night students attending this year being seventy-three. Instruction is also given in the day time to the full course engineering

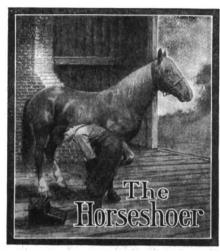


A HIND SHOE TO PREVENT FORGING

students, all of whom are taught blacksmithing so far as it applies to toolmaking.

The shop is supplied with twelve hearth furnaces, an exhaust fan and

a blower, while a steam hammer occupies the center of the shop. The demands for admission are numerous.



A Good Method for Preserving a Horse's Feet is as follows: Wash the feet with cold water at least twice a week. About every three weeks, after washing the feet, allow them to dry and then apply this ointment: Take natural asphalt and boil with enough beef tallow to make it run like molasses. Then put into each quart of the mixture two ounces of oil of turpentine. Apply the ointment to the wall of the hoof and on the sole.

O. E. S., New York.

Some Special Shoes for Special Cases.

The several engravings of shoes are from photographs of sample horse-shoes forged by Mr. A. F. Libby for various conditions and ills of the feet.

No. 1 is a rolling-motion shoe, with a long roll on the ground surface. The crease, it will be noted, is carried around the toe of the shoe. No. 2 is another rolling-motion shoe, but with a short roll. The right branch of this shoe is turned in and up to come over the bar of the foot. No. 3 is a common bar shoe to give frog pressure. The specimen is a well-formed shoe and shows excellent workmanship. The crease in this shoe is also carried around the toe and well back toward the heels. No. 4

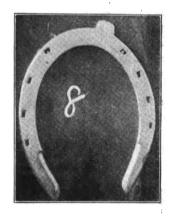
shows a special shoe with extended heel calk and double half bars for frog pressure. It will be noted that the nail holes are all well up toward the toe, though the crease is full from heel calk to heel calk. No. 5 is a shoe for corns and quarter crack. No. 6 shoe is especially for an animal that forges.





This shoe is placed on the hind foot. The branches are both long, while the left branch carries a long calk from toe to heel. No. 7 is a shoe for the kneeknocker. The left side of the toe carries

FOR THE
HORSE
THAT
PADDLES



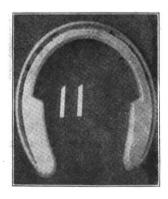
an extension beyond the edge of the hoof and the same side is also weighted. Note that the right branch is very narrow and light. No. 8 is for the prevention of paddling. The right side of the toe carries an extension. No. 9 is a front shoe to cure interfering. Note



FOR INTERFERING IN FRONT



SHOE WITH A TOE WEIGHT



FOR THE HORSE THAT FOLDS



HEAVY SHOE FOR THE FORGER

position of extra metal. The shoe is creased all the way around. The nails are well up toward the toe on both sides. No. 10 is a toe-weight shoe to lengthen or extend the stride. No. 11 is a shoe for the horse that folds. The heel branches are both weighted, while

the toe is light. No. 12 is a heavy shoe for front of horse that forges. This shoe is weighted at the toe so as to give increased action to the front foot. The crease is not brought around the toe but is brought back well to the ends of the branches.



Storing Automobiles in a Large Plant.

To keep up with the demands of the busy selling season it is necessary for large automobile factories to build thousands of vehicles in a very short time. These must be stored until the shipping season and subsequently storage becomes a big problem with the manufacturer of motor vehicles. The accompanying engravings show how the problem is solved in a large Michigan factory. In Fig. 1, automobiles can be seen closely packed on the floor

building in which these photographs were taken contained over two hundred automobiles at the early part of the present season.

Adjusting, Repairing and Caring for an Automobile—7.

Carburetors.

For both the Kingston and the Holly carburetors there are four adjustments.

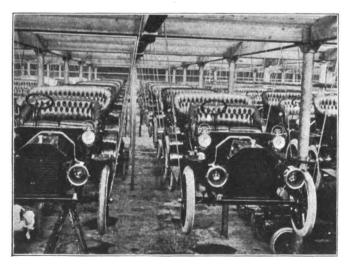
(1) The needle valve which regulates the flow of gasoline through spraying nozzle; (2) Auxiliary air inlet by which

bending up or down the fingers of the float valve lifter.

It is time well spent to disconnect a carburetor from the motor and take it apart piece by piece, to thoroughly familiarize yourself with its principles, its mechanism and the function of each part. In re-assembling, be careful not to allow particles of dirt, waste or other foreign matter to get in, as these will cause troubles that are hard to diagnose. The hands should always be clean when working with a disconnected carburetor.

To Adjust Kingston Carburetor.

Set the auxiliary air valve so that about half the threads on the adjustment screw are exposed; loosen setscrew which locks needle valve adjustment and gently screw down needle until you feel it touch the seat, being careful not to put sufficient pressure on to destroy the seat or cut a groove in the needle valve. Unscrew three fourths of turn, start motor with throttle half open; let run until motor warms up; open throttle wide (full). Leave spark in start position; turn adjusting needle for more or less gasoline, so as to get the greatest speed; close throttle carefully, screw in airadjusting valve until motor runs rich (black smoke, etc.); unscrew air just until motor runs even (steady). Fine thread on air valve allows of wide range of adjustment. If you unscrew air valve further, motor will continue to run, but have no power on low





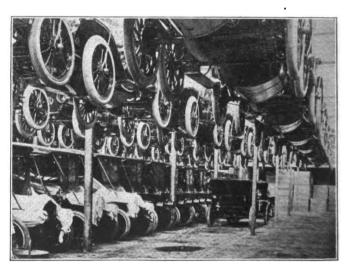


FIG. 2.—LOOKING UP AT THE SUSPENDED CARS

and also suspended by steel rods from the heavy timbers above. In Fig. 2 is shown the view of the suspended automobiles. It will be seen that they are closely placed so as to make use of every bit of available space. The the tension of the spring is tightened or loosened to admit more or less air to compensate for different engine speeds; (3) Throttle adjustment; (4) The constant height of gasoline in the float chamber may be regulated by speeds and will start hard. To prove mixture, advance spark lever three or four notches, open throttle quickly. If you hear a popping in the carburetor as you open, a little more gasoline; if motor speeds up slow and uneven, less

gasoline or a little more air. If, when throttle lever is in the first notch, the motor does not run slow enough to suit, adjust the throttle so it will close further, being careful not to permit it to close enough to stop the motor entirely.

To Adjust Holly Carburetor.

Close (screw down) adjusting needle to seat; unscrew half turn; start motor; close throttle; turn needle until motor runs even; open throttle wide, let motor speed up; hold finger partly over intake if motor speeds up more by doing this; screw down air-adjusting sleeve (screw) to cut off part of the air; if motor runs slower when shutting off air at intake valve give more air.

When the car leaves the factory throttle-adjustment is usually pretty well open, as the motor and car are stiff, and this is necessary to guard against stalling the motor when starting. When it has become limbered up, however, this should be changed.

If the throttle will not close far enough to suit when the lever is in the first notch, disconnect the ball joint from the lower end of rod and screw up the socket one or two turns. Connect it up again, and with the throttle adjustment screw you can obtain the desired result.

For racing or hill climbing a richer mixture is necessary than for ordinary driving and this can be determined only by practice.

Not one person in ten is able to acquire quickly the knack of adjusting a carburetor. Patience and keen observation are essential to success in this. Until your sense of smell has become sufficiently acute to detect the odor of a "too rich" mixture, and your ear so well attuned to the ordinary sounds of a motor that it will detect the slightest variation in the exhaust of one cylinder as compared with another, at high as well as at slow speeds, you cannot hope for ideal results.

The besetting sin of most motorists is to meddle unnecessarily with the carburetor, particularly with the auxiliary air adjustment. Ordinarily this should require no attention after once having been adjusted, unless as occasionally occurs the spring loses its tension, in which case it is necessary to remove the spring and pull out the large coils half an inch. If this will not suffice the only cure is to get a new spring.

Excessive vibration of the engine when running slow and when there is

no apparent miss may be due to lack of compression in one cylinder. This cylinder gives a lighter impulse than the others, thus destroying the balance of the engine.

One of the most aggravating troubles, and one difficult to locate, is a leak in the intake pipe. This may be caused by a small sand hole in the casting. Occasionally the gasket between the carburetor and intake pipe is eaten away by the oil so as to allow a leak. Either of these makes it almost impossible to get an accurate adjustment of the carburetor. In case of an irregular miss, which you cannot locate in the carburetor, it may be well to

soon become loose and noisy when the bearings had properly seatedmakes it impractical to adjust the carburetor for very slow car speeds without making it so sensitive that the unskilled driver will frequently stall his motor when starting. Another reason is that the more economical a carburetor is the more sensitive it will be to climatic changes. Vibrations of altitude and other climatic conditions—the difference between sea air and the lighter air of inland sectionsmake it necessary that each carburetor should be adjusted to meet its own peculiar climatic conditions.

Also as no two drivers handle a car

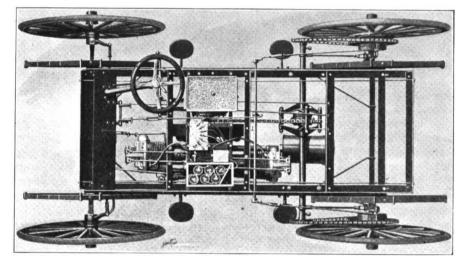


FIG. 1-A TOP VIEW OF THE BLACK HIGH-WHEELED CAR

remove both exhaust and intake pipes and carefully replace them.

When adjusting needle valve do not give it a quarter or half turn at a time, but change the adjustment by very slight degrees, waiting after each change until the motor has had time to get the new mixture.

When adjustment has been made care should be taken to tighten the set-screw which holds the needle valve and the thumb nut which holds the air adjustment, so that neither of these can change their position on account of vibration of the motor. Sometimes the act of tightening the set-screw will change the adjustment slightly, in which case with a pair of pliers give it a very small fraction of a turn to the left, until you have obtained the desired results.

The average owner thinks the carburetor should be adjusted before the car leaves the factory and forever after require no further attention. This is impossible, for many reasons, one of which is that the new car being stiff in every bearing—if it was not it would exactly alike, the same carburetor adjustment will never suit two individuals. Again; while theoretically possible to adjust a carburetor to give satisfactory results at both slow and extremely high speeds, no carburetor has ever been made in which it was possible to obtain maximum efficiency under both conditions with the same adjustment.

In a case of irregular firing of the engine, which is remedied by a very slight turn of the needle valve either way (and a frequent recurrence of this condition generally indicates that a small particle of foreign matter has become lodged in the needle valve, a slight turn of which will serve to dislodge it temporarily), unscrew the needle valve and take it out, so as to allow the obstruction to escape with the overflow of gasoline when it is flooded. If this does not suffice, disconnect the gasoline pipe at the carburetor; draining out tank, pipe and carburetor. Occasionally it will be found necessary to take the carburetor apart and thoroughly clean it.

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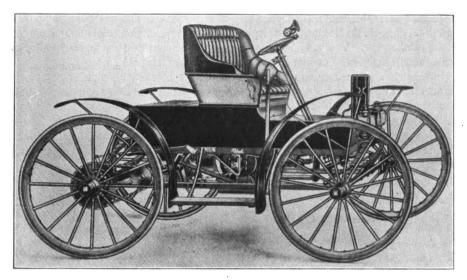
Weak batteries will call for frequent adjustment of the carburetor and give no satisfactory results on any adjustment. The remedy is obvious. "waterlogged" (saturated with gasoline), so it floats lower; or, by too heavy pressure on the "primer," the float levers may have been strained downthe trouble. If float is "waterlogged," dry thoroughly and coat with shellac. Dry thoroughly before replacing.

Be careful not to screw needle valve down on the seat so hard as to destroy the seat or cut a groove around the tapered point of the needle; this done, it is almost impossible to obtain an accurate adjustment. If done, the cure is preferably a new needle, or with a fine file or emery cloth carefully file until the groove has disappeared and the point is a true taper.

A good mixture for running is not always best for starting the motor cold. Don't change the mixture, but lay a glove over the auxiliary air port, flood carburetor and crank. It should go on the third half turn. Remove the glove; if motor is very cold it will require a minute or two to warm up. Slow spark and leave throttle open a notch or two; hold your hand or a glove over the intake until it begins to run regularly, after which it will perform as on the previous day.

In very cold weather it may be necessary to give a slightly richer mixture — more gasoline, — but this should be determined only after the motor has become warm.

It should be remembered that a carburetor adjustment made after the engine has been running so that the



THE BLACK HIGH-WHEELED MOTOR CAR

It is well to remember that there are several different points at which the correct relation between gasoline and air flow will give a good mixture—at one speed. There is only one, however, where a perfect mixture for all speeds can be obtained. To get this, patience is necessary. Once mastered, the problem becomes simple.

ward. In the latter case shut off gasoline at tank; disconnect carburetor; lift out float; measure height of fingers and then bend them upward slightly one thirty-second to one sixteenth of an inch. Replace. If carburetor floods, the float is too high; remove and bend fingers down slightly. The most frequent cause of carburetor flooding is

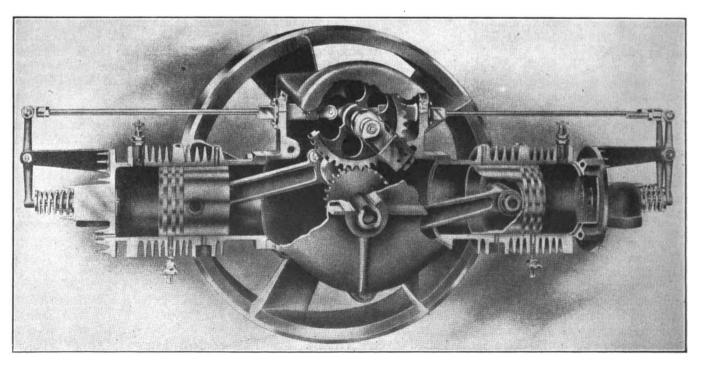


FIG. 2—THE BLACK MOTOR AND PARTS, SHOWING PARTS OF INTERIOR MECHANISM

If motor starts hard when warm, the level of gasoline in float-chamber is probably too low. This may be caused by the cork float having become

dirt between needle and seat. Remove needle; wet needle point, dip into fine pumice stone and, seating needle, give three or four half turns, will remedy inlet pipe, carburetor and surroundings have become warm by the heat radiating from the motor, will not give perfect results when starting the cold

engine in the morning. By laying a glove over the intake for a few seconds until the motor has gotten warmed up you will find it will run.

(To be continued.)

The Black High-Wheeled Motor Car.

The Black car is built in several styles, but the same general lines are followed in each. In Fig. 1 is shown a top view of the chassis. The body is attached to the chassis frame by four bolts. The removal of the bolts allows the body to be lifted clear of the chassis, thus presenting the entire machinery of the car to view. The gasoline tank, the oiler, battery box and coil are all attached to the sub-frame of the chassis.

The transmission is of the planetary type, with two forward speeds and one reverse. From the motor the power is transmitted by means of a chain to the countershaft and then by means of chains to the sprockets at each rear wheel.'

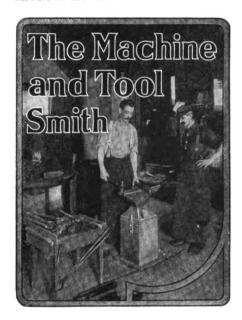
The Black motor is shown in Fig. 2. It is a two-cylinder, horizontal, opposed engine of the four-cycle type. The engraving gives an excellent idea of this power plant, the operation of the valves and the general construction throughout.

It will be seen that the heads of the cylinders are removable, as are also the cylinders themselves. The valves are mechanically operated by means of a cam shaft, thrust rods and four operating arms. The motor is air-cooled by the combined flywheel fan.

The control of the car is by means of a regulation steering wheel, a foot pedal for the low forward speed, while the high speed and reverse are controlled by a hand lever at the right of; the car. The spark and throttle levers are placed on the steering rod.

The frame of the car is of angle steel.

The engine, transmission gear and flywheel are suspended from two 1½-inch angle steel cross braces, placed in the middle of the car.



A Boltless Rail-Locking Plate.

This device can be used on old or new rails without any further preparation than to remove old-style plates and replace with the new ones. This joint is said to make the connections of the rails more ridged and at the same time permit the expansion and contraction of rails without loosening of the joint.

The base plate, A, shown in the engraving is simply a rest and receives the end of the rail in a perpendicular position, giving it a larger bearing surface on the ties. The side plate, B, is a fulcrum under the ball and the thickness of this plate is diminished at the lower edge where it rests on top of the web so that when the key C is pushed into position the entire joint becomes locked. Projections D D on

the inside of the plate B fit into the regular bolt holes in the rails. Projections at the ends of the plate B keep the plate from moving horizontally when in position. The key C when forced into position locks the entire joint. The drawing or pushing of either rail has no effect on the combination.

Electricity in Tempering and Annealing.

Coming with the reduced cost of electricity for commercial purposes, especially along the lines of independent motor drive, in the machine shop and elsewhere comes a question of fully as great importance in the forge shop; that of tempering and annealing by electricity. This question is not a new one, as might be supposed, for small furnaces of an experimental character have been in use for some time by investigators along that line.

All of the furnaces up to date are of the resister type (except Lagrange and Hoho methods), in other words, the heat is produced in some other material outside the material being

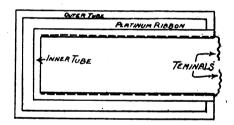
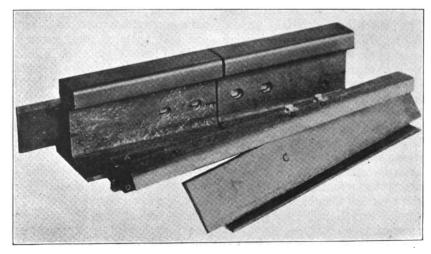


FIG. 1-ONE STYLE OF ELECTRIC FURNACE

heated. It might be well to state here that the electric arc for this purpose is out of the question, as the heat is too intense and concentrated at too small a focus. Platinum has been used as the resister in furnaces furnishing heat up to 1450 C. (1642 F.). and even as high as 1500 C. (2732 F.). In this type of furnace platinum wire or ribbon is wound around a porcelain tube, the turns being very close together to prevent radiation. The ribbon or foil has the advantage in that for the same resistance it will cover nearly twice the area, thus reducing radiation to a minimum. A tube one inch in diameter can be raised to 1200 C. (2192 F.), in five to six minutes.

There is another furnace of similar type, but in which the resister is made of a thin, perforated platinum ribbon .00035 of an inch thick which is made into and is entirely covered by the porcelain to a depth of .0156 inch, the outside wall being thicker.



AN AUTOMATIC BOLTLESS RAIL JOINT

is necessary to have a grade of porcelain the expansion of which must be about the same as that of the platinum. Otherwise, the inner wall of the tube

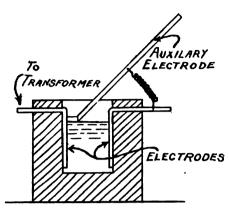


FIG. 2—THE RESISTER IS A COMBINATION OF METALLIC SALTS

would soon crumble. A second tube with an intervening air space surrounds the resister and reduces radiation to a very small figure. Although confined to small sizes these furnaces are reasonably efficient and with electricity at twelve cents per kw-hour will about equal gas at one dollar and a half per one thousand feet.

Kryptol is a resister made of coke, carborundum and graphite; this resister being a patented combination. Up to 900 C. (1652 F.), this is used in cartridges to advantage, as they exclude the air and the temperature may be raised very quickly.

A most practical furnace is one made by the General Electric Company. The resister in this furnace is a combination of metallic salts. At the present time it is made in one size, only; $7\frac{7}{8}$ x $10\frac{3}{8}$ -inches deep. The arrangement of the furnace may be seen at a glance at Fig. 2.

The resister arrangement is shown in Fig. 2. The electrodes at each end of the furnace are in constant contact with the salts of the bath and maintain a constant temperature, as the current penetrates every part of the bath. The resistance of the salts remains constant at any particular tem—

perature, thus $C = \frac{E}{R}$. Increasing E or the voltage increases C or the current thereby increasing the heat and raising the temperature of the bath. The voltage, or E, being under the control of the operator by means of the regulating transformer, any degree of heat may be maintained within the range of the furnace; the range being from 250 C. (482 F.) to 1350 C. (2462 F.), the proper combination of salts being

used. For ordinary grades of machine steel requiring a temperature of 750 C. (1382 F.) to 800 C. (1472 F.), the bath consists of equal parts of barium chloride and potassium chloride. For high-speed steels requiring a temperature of 1300 C. (2372 F.), barium chloride alone is used.

A furnace of this kind has several advantages over an open fire or even an electric furnace employing a resister of such a nature as to allow the air to come in contact with the metal being treated. Being able to maintain a constant temperature, duplicate parts may be given the same temper to a nicety. In tempering high carbon steels the operator does not have to contend with foreign matter changing the percentage of carbon. Every part of the bath being of the same temperature except at the very top and that not

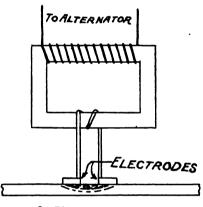


FIG. 3—FOR ANNEALING SPOTS IN ARMOR PLATE

deeper than six or eight tenths inches, due to radiation, every part of the piece is subject to the same degree of heat. It can be used where an open fire would be out of the question. In these furnaces single-phase A. C. is best adapted, for when D. C. is used electrolytic trouble is apt to occur.

The furnace consists of a crucible in fireproof clay which is surrounded by an insulating material, usually This also rests in fireclay asbestos. and the whole being put up in a castiron box. A regulating transformer for voltage regulation in connection with a special regulating switch is employed for controlling the heat. In addition are the necessary voltmeter, ammeter switches, fuses, etc. Provision is also made for increased voltage in starting. The cost of operating these furnaces is very low, operating at less than half the cost of gas, unless exceptionally good gas rates are secured.

The process as discovered by Lagrange and Hoho arranges for an elec-

trolytic forge consisting of a metalliclined crucible or vessel containing a tempering solution. By placing one end of the bar to be heated in the solution and a suitable connection on the other, (one terminal of the electric current being connected to the metal lining of the containing vessel and the other to the connection on the end of the bar). A heavy current of low voltage will bring the bar to the desired heat; suitable regulating apparatus being employed.

For the annealing of local parts in armor plates and large pieces of sheet and plate metal, where a small place needs annealing for drilling or some other machine work, alternating current with a special transformer works admirably. See Fig. 3. The terminals of the low voltage transformer are placed in firm contact one on each side of the place to be annealed and enough current sent through to soften the spot, surrounding parts not being affected.

The furnaces spoken of in this article have all been of small size, except the Lagrange and Hoho methods. For the tempering of long bars of metal by electricity in a practical way has not been worked out successfully to the writer's knowledge. The furnace using chloride salts is not practical for long bars, due to the fact that the steel has a tendency to take up more or less of the current, thereby causing unequal heating of the bar. The Lagrange and Hoho methods, except for special work, are not practical on account of the large amount of current consumed. from the fact that a large bar of steel is a very good conductor.

The Smith and His Work—3. ROBERT B. KERR. Welding.

Welding is one of the most important parts of a smith's work and, therefore, one that he must study carefully, if he is to become proficient in business.

Requirements of modern shop practice are getting more severe every day, and it is absolutely necessary that all welded work turned out be of the highest class. Therefore, no pains should be spared by the smith to make himself thoroughly proficient in the art.

Work from the solid wherever possible; weld only where absolutely necessary, is a safe rule to follow.

The highest possible efficiency of the perfect weld is one hundred per cent, and any flaw or imperfection therein, however small, reduces its

strength in proportion. Where tests have been made they show that in actual practice the average weld on mild steel has not more than ninety per cent efficiency in a tensile strain, seventy-five per cent in a vibratory and about seventy per cent in bending. It will thus be seen how important it is that all welds made be as near perfect as possible.

Heating.

The chief essential to a solid weld is of course, a clean heat, yet too many smiths seem to forget this when at the forge and trust to plenty of blast and blind luck to get the work hot enough to stick together. To be able at all times to take a clean, sure welding heat is a valuable asset to any smith, and should be rated accordingly. There is nothing mysterious about it, neither is it guesswork.

In heating, the fire should be kept replenished with coke, moderately well broken, so as to maintain a good body of live fuel below the work. Do not let your fire go hungry. Never, under any circumstances, throw green coals or the forge dust and cinders on the fire. The former is filled with gas, tar and sulphur; the latter is mainly composed of slag and iron oxide, and both will spoil any heat and dirties the fire. If there is good clean foundry coke available a small quantity of it, broken up and mixed with the forge coke, will sometimes help materially in keeping up the body of the fire, especially if considerable welding is being done. Be moderate in its use, however, and see that it is clean and well broken up, otherwise, being slow of combustion, it will get dead in the fire

Maintain the fire in proportion to the work being done, and always have a body of live coals amply sufficient to cover the work.

In welding, use the blast moderately. Steel will only absorb a certain amount of heat in a given time, the rest is simply waste. Disturb the fire as little as possible. After scarfing and before placing the work in the fire sprinkle a little welding flux on the work and let it soak in a few moments. By doing so the flux comes in contact with the iron or steel before it has time to scale, and in most cases the one application is sufficient. If, however, the flux has to be applied later, remove the work from the fire just before it attains a welding heat, brush the scale from the scarfs and apply sparingly. Give the heat time to soak through the work, gradually increasing the pressure until the metal is at the required heat. Do not leave work in the fire a moment longer than necessary. Remove from the fire and brush off any loose particles of cinder that may have adhered to it. The brilliant, rich-looking surface of the metal will shine with an incandescent glow. Hammer firmly together, watching the ends of the scarfs carefully, and you have a job upon which the lives of men may be trusted; a thorough union of particles; the perfect weld.

(To be continued.)



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

A Query on Screw Plates.—Can you please tell me where I can get repairs for the Fletcher Ever Ready screw plates?

JOHN W. CONNELLY, Alberta.

Wants to Make a Well Pump.—I would be pleased if some brother would tell me through your columns how to make a good well pump for use in a fifteen-foot well.

WM. O. HEARNE, Arkansas.

To Prevent Hot Bearings.—Tell my brother blacksmiths that if they have trouble with hot bearings on their engines where they use hard oil, just mix beeswax with their hard oil and the bearings will run cool.

V. GIEBER, Oklahoma.

Wants Information on Springs.—I would like to see an article on the bending and tempering of cold springs made from 2 by \(\frac{3}{2}\)-inch stock, not confined to one pattern. I have quite a bit of this work to do, as I am a smith at the Consolidated Progress Gold Mine.

A. J. King, New Zealand.

Wants a Time Scale.—I would like to see published a scale giving the time necessary to complete blacksmith and woodwork on both new and repair jobs. It would be of great value to every smith, and to a man who is compelled to work under time on any jobs it would be a great help. It would also assist the smith in making prices.

J. J. ZELLER, Saskatchewan.

Wants Plow Information.—Will you kindly tell me the best way to lay steel plowshares and also how to temper steel plowshares for stony land? Please give me all the particulars about heating, sharpening and tempering steel plowshares for stony land.

H. B. DRINKLE, Saskatchewan.

Another Case of Parted Wall.—Will some brother please tell me what to do for a mule the wall of whose foot has broken loose at the toe? You can see up in it to within one inch of the hair. I had a mule at my shop today in that shape and I painted its foot with raw linseed oil and pine tar and put a tip shoe on it. If there is anything better for it I would like to know it.

W. W. Abney, Alabama.

Wants Information About Texas.—I live in a town of about three hundred inhabitants that has two shops, but would like to know if any brother can tell me about the craft in Texas. I would like to know all about it. We are away down on prices here: New shoes, light, \$1.20; heavy, \$1.40; old shoes, \$.70 and \$.80; plow points, \$.25; and other work accordingly. I would like to know if there is any way to raise the price. Prices are about the same in other towns.

J. D. Rhodes, Ohio.

Side Lines.—I now have as side lines farm implements, buggies and wagons, paints, oils, harnesses and a general harness repair shop. Three of us run it all. I live in a village of about only one hundred and thirty-five population, but there are other large towns around me; the farthest one is four miles from here. I have been doing a business of four thousand dollars a year and must beat this by one thousand dollars this year with the addition of the harness shop.

C. F. Heine, Illinois.

A Letter from a Young Smith.-I am highly pleased with your paper and intend to take it as long as I live, so you may count on me as a permanent subscriber. I am a young man, barely twenty-one years old, and have been in the trade four years. 1 have never served a day as an apprentice, but started by reading books, literature, etc., on the subject, and now by hard study and practice I am a fairly good smith. I made a light trimmer and installed it in my shop a year ago that is a dandy and I am going to send it in for publication as soon as I can find time to make the draw-WM. O. HEARNE, Arkansas. ings.

A Texas Note.—I came here eight years ago with about forty dollars' worth of tools and material. Now I have about six hundred dollars' worth of tools and material, two lots, 50 by 100, and built me a good shop 30 by 40 last fall. I get all the work I can do and have to hire help about three or four months in the year. I am thirty-six years old. I have a son eleven years old who helps me during vacation. I get work that passes other shops and comes to me. My motto is, "What is worth doing is worth doing right." I like our paper, The American Blacksmith.

W. H. Alston, Texas.

An Oklahoma Power Shop.—We have put in power and now have a Perfect trip hammer, a Bricknell jointer, an emery wheel, a power blower and a No. 16 Western Chief drill. Our smith shop is 25 by 70 and the paint shop is 16 by 24. There are two of us in the shop and one painter. Work is

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plentiful this spring, but help is hard to get. Prices are low in this part of the country. This is a town of forty-five hundred inhabitants and we have nine shops here, so you can imagine what prices we get. All have something to do and if some can't get it any other way they get it by cutting the price. Juenger & Huston, Oklahoma.

On Spreading Feet.—Will some one tell me in the next issue the best way to spread and grow larger feet on a horse three years old. I have a fine stallion I am working and I have his feet in better condition now than before I started work. On them I first used a shoe that I could spread open which would open his heels. He does not have much frog. Now I have changed his shoes and I am now using toe tips and I bent his heels down just as low as they will bear, to see if his frog won't help to open his feet. I wish to hear from some up-to-date horseshoers and get their ideas on spreading feet. W. E. Eatman, Alabama.

A Trio of Practical Hints.—I have long since learned that I didn't know it all. Today I was setting a wagon tire that had a thin edge on one side and a thick edge on the other, and it would turn over in the machine. I stepped to my forge, made a feather-edged wedge to fill up the part worn out and put it in the machine and it worked fine. I had a buggy body that had spread apart and as I didn't want to rod it, I picked up a wood-saw turnbuckle and bolted two eye-bolts on the inside of body, and pulled the body up with the turnbuckle. If you wish to lace a belt begin in center of belt and lace right and left and back to center and then punch an extra hole, about one inch behind the middle holes, for ends of lace to come back on back side of belt, so as to be out of the way of the S. W. SHORT, Texas. pulley.

A Pennsylvania Letter.—I have no kick coming on "Our Journal." Some of the articles are instructive and some amusing, such as J. S. Shultz' cure for corns, as it is plain he doesn't know the nature of a corn on a horse's foot. Sammie G. Goff is thinking of going to a settlement where there are no other blacksmiths within six miles. I think he had better go into some good shop and finish his apprenticeship, then work as a journeyman for a few years in good shops, and then locate where there is some trade to be had. Then again, there are some other horseshoers who happen to stop a certain horse from interfering and they think it will work on all horses, and probably before their articles are printed they find out their mistake.

I have been a reader of The American Blacksmith for some years and have no intention of letting my subscription run out as long as I enjoy reading it as I do at present. Frank M. Drake, Pennsylvania.

About Fire Clay.—In reply to Mr. Luke Blabey's questions on fire clay would say that true fire clay is a variety of clay entirely free from lime, iron or alkali and, therefore, infusible. There is, however, little clay which is entirely free from all three elements. By analyzing it, is probably the only way in which fire clay can be distinguished from the ordinary clay. However, for the fire pot in the forge ordinary river clay will be found arely satisfactory. The main point is a get good clay and then to pound it well into place. The clay should

be entirely free from pebbles and used just as it comes from the river bank. Don't be afraid to pound it. Use your heavy hand hammer and hammer the clay into place, just where you want it.

As to cement, I have heard of it being used and with success, though I cannot boast of having had any experience with it.

If you want to get good fire clay you can possibly secure it from a brick or sewer-pipe manufacturer, though I think it unnecessary, if good river clay can be secured.

I. J. KRAMER, New York.

That Flat-Footed Mare.—In reply to Friend George Campbell, of Idaho, regarding the flat-footed mare going lame when shod, will advise the following: I believe his horse has long pastern bones, which will naturally bring the foot out from under the cannon bone, leaving in most cases a real flat foot, thin wall and low heels, which run very thin and weak at cleft of heels. Do not shorten wall too much or cut out horny sole; leave foot natural and strong. Use a light bar shoe, fully as large as the foot, and punch two nail holes at toe. Use six nails only to a shoe; punch nail holes at the same angle as wall and use no toe calk.



A CALIFORNIA GENERAL SHOP

Ascertain angle of pasterns and raise to proper angle by welding calks at heels. Pack the feet with tar, using leathers. Do not draw shoes very tight. Remember the frog must be soft before you may put pressure on it. This you must do to relieve weak heels. The most important is to relieve heels and shoe accordingly and bring her pastern bones to a proper angle.

ALBERT MEIER, Pennsylvania.

A California General Shop.—My shop is thirty-five by eighty-seven. We do wagon work and general blacksmithing, also rubber tire work. I employ two men steady and three part of the time. I am a believer in power. I have a 6-H.-P. Fairbanks-Morse Gasoline engine, one Little Giant trip-hammer, emery wheels, power blower, one Little Giant bolt-threader for power, one power tire bender, two drill presses, one House cold tire setter, one wood boring machine, one jointer, one rip-saw, one bandsaw, one shaper, one gear-rounder, one sander, one sixteen-inch planer, one spoke-I have one crane and tenoning machine. one hoist to handle all the work. I am interested in the automobile depart-H. BLEIBER, California. ment.

Forging and Clicking.—I would like to say a few words in regard to horseshoeing. I have been at the business about ten years and would like for some brother to tell me how to stop a horse from forging or clicking. I have tried most every way I could think of but have never been able to stop one entirely. I have never come across a horse that cut his ankles or knees but that I could stop him. With a horse that interferes I first lower the outside of his hoof then take the inside quarter off all it will stand and raise the shoe. In regard to plain every-day shoeing, first shoe the feet nicely, keep the heels low and wide. Don't cut the brace bar away that runs along the frog, unless it is diseased. Fit the shoe to the foot and don't rasp the outside too much. If wide quarters or flabby feet require rasping to shape the foot then use a little warm tallow. In regard to clinching, don't file a notch under your nails, never allow your rasp to touch your nails after they are nipped off. I prefer a short clinch. Hoping to hear from some brother on forging and thanking our paper W. B. Hubbs, Kentucky.

Welding Boiler Tubes.—I notice in The American Blacksmith that C. J. Pederson asks for information on welding boiler tubes. Now, if I can say anything to help the brother out I will be glad to do so, as I have had a great deal of experience at round house shops on railroads, where there was no machine.

First, cut off the damaged end of the tube and it is best done in the lathe. Then cut the short piece a little longer than is required, heat the end cut off, first plugging the other end with something (old waste is very good to stop all draft). the heated end bell shaped by driving a short pin in it or working it on the anvil. Then take the short piece and grind a short bevel in one end so that it will go in the long piece about an inch and a quarter. Now put them together in a nice clean fire and take your heat. As the heat rises have a light hammer with a long handle on it and tap lightly on the outside scarf and keep the flues turning all the time. Use some sand on the heat, and when at a white heat it is ready to come out. Before getting ready to weld make a mandril that will fit the flues nicely. Now, if your splice is six inches long, weld a collar eight inches from the end so that it will be sure to reach above the top and leave sufficient room behind the collar so that your helper can handle it. When you bring your heat out on the anvil have your helper insert the mandril in the tube up to the collar; have a pair of swedges the size of the tube and weld them on the mandril. After the tube is cold, plug the welded end so as to be as near water tight as possible, then fill the tube with water above the weld and if it does not leak you have a good job.

J. L. SHORTTRIDGE, Maryland.

A Shop Run by Water Power.—My shop is built over a small stream with a distance of twenty-four feet from the shop floor to the bed of the stream. The shop is thirty-two by forty-two feet and fitted with a forge, a vise, a press drill, a tire bender, an upset, a bandsaw, a thirty-two inch circular saw, a small ten-inch ripsaw for edging and one eleven-inch cut-off, a grindstone and two emery stands. For power I have an eighteen-foot breast undershot water wheel which I myself put up. I used a bull wheel from an old horsepower for the large gear and the flywheel makes eleven revolutions

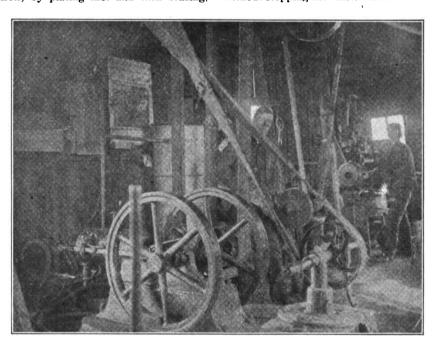
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to one of the water wheel. The wheel makes fourteen revolutions per minute and develops about 10 to 12 H. P. I built my bandsaw from two old mowing machines, using the wheels for pulleys, and covering wheels with four-inch rubber belting after grinding down true on emery. I use a twenty-foot bandsaw, one inch wide the most, but for cross-cutting wood I like the half-inch saw best. I like the bandsaw better, but the circular saw does faster work. I have built my shop from scrap and all works well.

S. A. PRICE, California.

Handling Vicious Horses.—I look forward to "Our Journal" with much interest, as I find many little things that help me in different ways. During our harvest 1 have had several breakages which I have repaired (thanks to The American Blacksmith) by plating first and then brazing,

for general blacksmithing information. I think I know my business about as well as the next man in the line, but can still learn. In fact, we have to keep on learning to keep up with the times. I have had about twenty-five years at the craft, am still going and intend to keep at it. The most I do is repairs of all kinds. My shop is out in the country. My plant consists of a 31 horsepower Harnsby Oil Engine for driving a lathe, a band saw, a circular saw, an emery wheel, a wood-boring machine and also for tanging spokes. Then, also, I have a thirty-inch drill, two smaller ones and a drop hammer of my own make. The fires are blown while the engine is going, by working the bellows with a belt. I can get as good and as even a blast as the best gear you can get, with the advantage that, without stopping the blast. I can disconnect



THE POWER CORNER OF A NEBRASKA SHOP

which I find fairly easy. In fact, I have taken to brazing all jobs where welding is not practicable and I succeed very well.

I read with interest the different letters on shoeing and the different methods both in handling nervous and unruly horses and shoeing those that interfere. My way of handling the vicious horse is to strap up the foot in front until the horse finds himself beaten. Then I can go about it with comparative safety. I find that simple strap aids more than any other thing, for, once on, it is there to stay and will tire him quickly. I have had considerable experience, especially with those just being broken. I use my shoeing hammer to hook under the foot and hold it this way until I can take it in my hand. I like the game and do my best to gain the mastery by kindness, combining strength and skill, not bulldog courage, as I do not think it good to take risks. To rush in and grab does not suit J. W. GRIBBLE, South Australia.

A Letter from Australia.—I have been a reader of The American Blacksmith for a number of years and would miss it very much if I had to do without it. I consider it the best paper of the kind I have read

the engine and blow with hand lever or vice versa. The power required to blow a fire is only about half-a-man power. I also have a punch and shear, screwing machine, cone, a corn crusher and a good, simple sinking trying plate. I think I am fairly well equipped for this part of the world.

GUSTAV WEISE, Victoria.

A Letter from South Africa.-Trade is very dull here now and on quite a different footing than it is in the States. It is quite a habit here to get one shoe at a time, when. as every shoeing smith knows, a horse should have his feet alike, both for comfort in action and as a safeguard against stumbling. The prices are being cut, too, and so-called smiths do work as low as seven and a half pence (\$.15) per shoe. My price varies according to class of work and customer. My lowest is one shilling, one pence (\$.25) per foot. I do only shoeing, and for the past year have worked entirely alone. Have often wished I could get away from here and come to work in the States, but am unable to go. The States would just suit me. The style and method appeal to me. Here one gets little encouragement to do his best. It is like casting pearls before swine. There is too much of the "one-shoeat-a-time" business, and as much time is taken up that way as having two put on. Trade has been bad since the war and there is very little prospect of improvement for a long time to come, as such a lot of people have left and hundreds of houses are empty. Hundreds of business houses have gone bankrupt. If some of the boys were to come here and work am thinking they'd soon quit, as the style here is totally different and wouldn't suit them. Smiths here have to put up with a lot and there is always a jobber ready to do work cheaper, and the folks here don't encourage good work very much. They're all for cheapness, and they pay more for it in the long run, but they can't see it. Best wishes and good luck for "The Boys" and yourself. To me you seem very close, though thousands of miles away. L. G. REID, Cape Colony.

A Talk on Axle Setting.—In answer to Brother Higginbotham's inquiry—if axles had no spindles and wheels had no dish whatever, spindles left perfectly straight would run plumb spoke and follow true as long as the bearing (box and axle) fitted snug. With the tapered spindle, if the wheel had no dish and axle was made straight on bottom, (spindle tucked down equal to taper of spindle) the same would be true with the same conditions of snug fitting bearings. Therefore, gather is necessary to overcome disposition of taper bearings to run out against nut and tuck to a greater amount is necessary to secure a plumb spoke, allowing more or less as wheels are more or less dished and also a small amount in addition to this to prevent pressure against nut. My rule in any axle (iron or steel) is to take the width of trackwith me, sixty inches—deduct 6½, height of spindle, and then add 1 inch for buggy axles and weld up to measure 53 inches between back end of boxes. Then tuck (in case of buggy axle) till bottom of point is a full 16 inch below the bottom of spindle against collar. This gives the easiest running and longest lasting job, because friction is reduced to a minimum. The amount of tuck or dip of bottom of spindle at point over bottom at collar diminishes as axles grow larger until at 13 inches. I leave them straight after that and then the point of the spindle rises gradually above a straight line or is a continuation of the bottom line of the axle. In wood axles, where the taper of spindle is greater, I do not use a gauge, but after ascertaining that skeins are not gathered and tucked in casting I lay out and cut axle body with straight edge on a plan I will give later if anyone can be benefited by it. J. T. L., Florida.

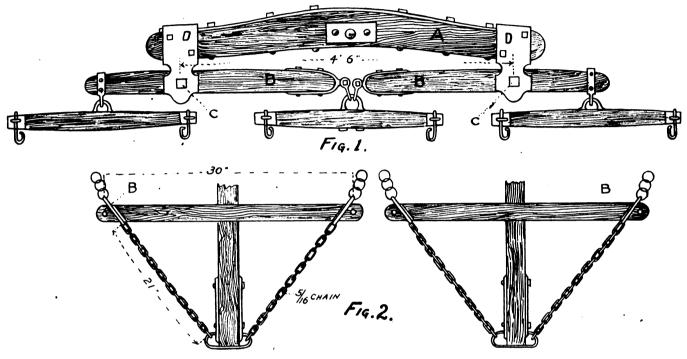
A Frank Letter from Indiana.—I herewith offer a suggestion or two which I have learned from experience, and I trust will be instructive to others and that they may profit by my experience. I am a very close student of scientific blacksmithing, also, to be a close student one must be a close observer. He must be awake, eager to learn, and to be this way is to welcome criticism with a glad heart, with earnestness and with thankfulness. And in the same spirit as this article is offered may it be accepted by those who become convinced. In the first place we are narrow. We think we know

our business, when we don't. We have a hammer, anvil, forge, tongs and a pile of junk, and call ourselves blacksmiths. When this is said—all is said. We don't know any more than the man who has no hammer, anvil, forge, and when our door is closed our brain is closed also. We loaf around the stores when night comes, with other loafers of every sort, and when we go

"What you know of it?" This I answered to his satisfaction, the other I answered to my satisfaction.

There are many things to learn, many things we should know, we know not. There is more to smithing other than to know when iron is red hot. We should know the effects of different heats on iron, steel, and how to treat such to bring about the

sorry, but I notice you always have to pay your own doctor bill. I have quit wrestling them by hand, as there are machines nowadays for putting such stock in and where the blacksmith's time is worth anything and he is not wide in the chest and low in the forehead he generally uses one, and will be alive and have his health when the others are dead. One way is to throw the brute



ANOTHER THREE-HORSE EVENER FOR HEAVY DUTY FROM DESCRIPTION BY WELS PETERSON IN A FORMER NUMBER

home we go to bed to sleep, only to wake up in the morning where we were yesterday, one, two, three and four years ago, when it comes to the knowledge part of blacksmithing.

We must place our ideal up high, and as we get further up let us keep our ideal still higher. The world is not going to wait on us if we get behind, so in order to be at our best and to help make things better we must, instead of loafing around, give our spare time to learning something, reading good journals, good books and getting ready for the work that is coming before us in the future. Don't wait for the job before preparing yourself, if you do you will not get it. The other fellow will be ready and you will be the loser of the job. You will do the muscle work and he will do the brain work. Let us work our brain and muscle in harmony and see if results are not better.

Some men have one specialty and go to seed on that, and for this reason I don't favor this idea of the specialty plan. In this we show a weakness in not being able to keep in line with our craft as we should, so we drop all but one class of work and give it only the study it should have. We make the specialty our hobby and think we know all that is necessary to know. We are deceiving ourselves then, because the more we know the more we find there is for us to learn.

I was asked the other day, "Where did you learn the trade?" I replied "I have not learned the trade." The party felt insulted for a moment, then he asked best results for different purposes. So let us seek to learn them. They are in reach of all. We must have some system to our work, some way of looking ahead, some way to do things.

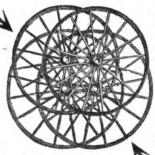
A. C. HOPKINS, Indiana.

Handling Vicious Horses.-I like your paper but there are some things written by some of the smiths that are not quite clear to my mind, at least, they wont always work. I saw an article in the January number, written by Daniel Johnson of Kansas, in which he recommends feeding a mean horse salt and sugar on a plate. I tried it the other day on one of our California horses and he jumped on it as though it was a rattlesnake and stamped the plate into splinters. Will Brother Johnson please explain how he gets the sugar into a horse that acts that way and keeps his mouth shut as though he had the lockjaw. he give him an injection or pry his mouth open with a crowbar? Out here in California where there are hundreds of heads of nervous, vicious horses, all outlaws, it would take two or three carloads of sugar and candy to go around. I would suggest that the owners of such stock turn them loose at the sugar pile the day before shoeing, as a man's time is worth something and we only get \$1.50 for shoeing.

My methods for shoeing a mean horse are to first make the brute fast so that he cannot hurt anyone and then go at him. If he gets bruised he can get well while the blacksmith is asleep. If the blacksmith gets hurt the owner of the horse is awful down and tie him the same as you would a hog. Then take a pole and put it through under his legs crossways and place each end of the pole on a trestle of suitable height, drawing his legs up tight. Then you can drive the nails without breaking your back. Another way is to sink four posts in the ground about two and one half by four feet apart. Have the lower ends fast to an anchor, drag the horse in on his back and make his legs fast to each of the parts so that four men can work on him.

If you want to go to a little expense. make a table eight feet high by twelve feet long of one and one-half-inch plank dressed on one side, fasten a piece of two and onehalf-inch steam pipe to the back lengthways about the height of a horse's belly. Sink four posts in the ground and bore a hole. Now, two good strong men take hold of the rope attached to the piece of four by four on upper side of table and a sudden jerk will flop your horse on his side. First draw him down tight and make his neck fast, then catch him by the tail and drag him into position if his feet are not exactly right. Make his feet fast in the notches. You now have him about three feet above the ground and in an easy position to drive his shoes on. After being shod, let feet loose, then let go neck rope, leave halter rope fast until last. Then flop table in upright position and let sling loose. Two men can shoe the most vicious horse with this kind of rigging in twelve minutes. This beats all the sugar, salt, apples or candy. E. Z. MARK, California.

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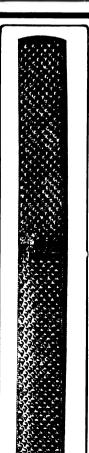
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Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, May 15, 19-19, and are subject to fluctuations. Corrected for The American Blacksmith by The National Heavy Hardware Reporter, Chicago.

No changes in quotations are reported from the different jobbing centers since last month. Trade in some sections has improved, while other correspondents report conditions about the same as last month.

The unseasonable weather and backward spring have kept roads in bad condition and have kept the farmers from the fields, consequently the smithing trade has been comparatively backward.

Horse Shoes— All Iron Shoes	\$4.40	
All Iron boos No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	4.25	
additional charged for packing more		
Mule Shoes	4.90 5.50	
Mule Shoes. X. L. Steel Shoes. Countersunk Steel Shoes	6 00	
Goodenough, heavy	6.00 6.50	
Toe Weight	7.00	
Side Weight E. E. Light Steel	9.25 5.50	
Countersunk Steel Shoes Tip Shoes Goodenough, heavy Goodenough, sharp. Toe Weigl.t Side Weight E. E. Light Steel Steel Driving O. O. Mule Shoes, extra	5.50 1.50	
Merchant Bar Iron— \$1.70 to \$1.90 rates full extras. and 20 cents per 100 pounds extra for broken bundles.		
Steel Bars— \$1.60 to \$1.80 rates, full extras.		
Toe Calks—	Per box.	
Blunt Sharp	1.55	
Carriage Bolts— 6 x 3 and smaller Larger and longer		
Machine Bolts— 4 x § and smaller Larger and longer	60-10%	
Larger and longer	50%	
Nuts— Less than 10 lbs, of a size From 10 to 50 lbs	2.50 off 3.00 off	
Washers— Same price as nuts. Skeins— Cast	. 65%	
Malicables— Common\$.09 Sections— 65%		
Springs—Single Spring, each \$1.25 Springs, black and half bright		
Hickory Lumber—Per Foot— 1 to 2½		
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Two Inch Sawed Hounds Tongues Front Hind	Per Pair. \$.40 \$ 45	
Patent Wheels—	` 40 %	
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3 x 44" . 4.70 6. 3 x 48" . 5.50 7. Single Trees—Oval—	85 10.50	
Mixed White Forest Second Growth Second Growth		
21" 1.70 2. 21" 1.80 3.	95 3.60 05 3.80 55 4.20	
3 x 38" . 2.50 3 x 40" . 2.65 4.	00 4.85	
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	xed White I Growth Second Growth	
2½" and smaller \$2.65 \$3		
Forest Second	lixed White I Growth Second Growth	
2 7 3 . 55 4	.65 \$5.00 .15 5.50 .30 5.75	
Forest Second	Express Singletrees, Turned— Mixed White Forest Second Growth Second Growth	
21" \$2.50 \$2 21" 2.90 3	.65 \$3.75 .65 4.00 .00 4.75	
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Forest Second 21" \$3.00 \$4	d Growth Second Growth .15 \$5.25 6.00	
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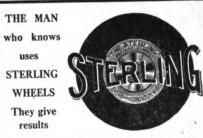
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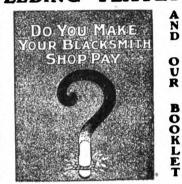
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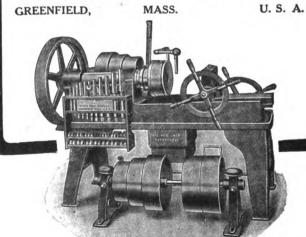
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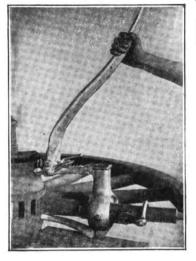
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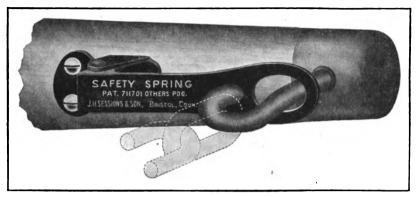




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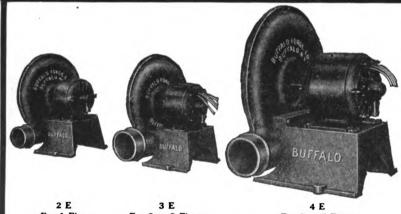
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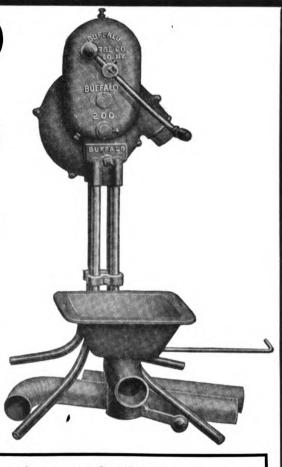
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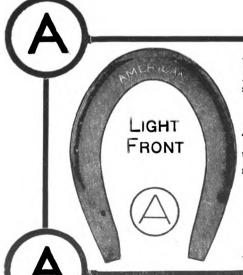
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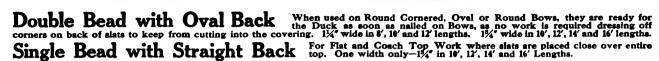
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Trade Literature and Notes.

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THE PROGRESSIVE BLACKSMITH AND CARRIAGEMAKER is coming to realize more and more the possibilities of a new field of business in the manufacturing and repairing of automobiles and motor buggies. The increasing demand for the wide-awake mechanic in this line should be of interest to many of our readers who could add an auto repair department to their business. In this connection Cray Brothers, of Cleveland, Ohio, have foreseen the difficulties of the ordinary blacksmith in getting auto repairs and parts at reasonable prices and have issued a complete net price catalogue of motor car supplies, which they will gladly send to any mechanic who is at all interested in this profitable branch of trade. Why not write them now for this catalogue and be prepared to supply your automobile customers with necessary parts and repairs at the shortest notice?

repairs at the shortest notice?

A NEW BUGGY TIRE known as the "Indiana Improved Steel Tire" has been perfected and patented by T. H. Parry, of the Parry Manufacturing Company of Indianapolis, Ind. It is based on the rubber tire idea and is claimed by the manufacturers to give three times the service of ordinary flat steel tires. It has somewhat the shape of rubber tire, as will be seen by the illustration herewith. The object of the corrugations is to avoid many of the jars and jolts resulting from small obstructions such as pebbles, etc., on the road bed. This shape is also said to prevent skidding, such as resulting from the use of smooth half-round tires that have been used by some manufacturers heretofore. The new tire is attached to the rim in the same manner as the ordinary tire, but on the inside surface there is a shallow flange which clinches it in place much better, protecting the edges of the rims and adding to the neat appearance of the wheel. The Parry Manufacturing Company are using this tire on several of their buggy and carriage jobs that are being done and express complete satisfaction with its performance.

OUT OF THE LAND of Yankee ingenuity comes another invention of interest to wheelwrights; however, the inventor of the Waterbury Spoke Extractor happens to be L. B. Parent, a French-Canadian wheelwright, of Waterbury, Conn. It is related that Mr. Parent for years chafed under the necessity of gouging spokes out by hand and set to work to devise something that would reduce the time and labor connected with this operation. The result of his efforts is claimed to be highly satisfactory, as his machine will do in minutes what formerly took hours. The sale of the Waterbury Spoke Extractor has up to this time been chiefly in New England, but an attractive advertisement in this issue of our journal offers it now for the first time to the trade at large. Our readers who have work to do in this line we believe will be well repaid for their investigation of this new invention.

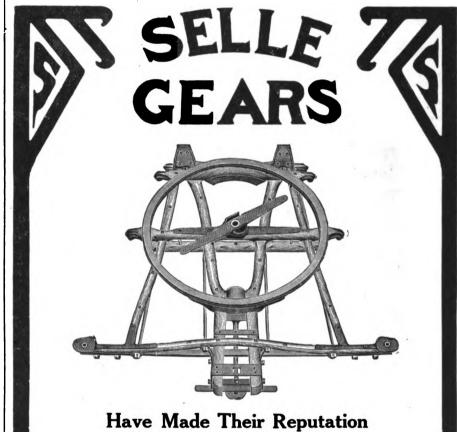
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New Books.

KERRAWALLA'S TEXTILE AND ENGINEERING DIRECTORY YEAR BOOK for 1909—Mr. C. D. Kerrawalla, of the firm of Kerrawalla, of the fourth edition of his Directory and Year Book.

Among the useful information embodied within its pages are: Complete Lists of Cotton Ginning and Pressing Factories, Jute Pressee, Cotton Jute, Woolen and Silk Mills, Iron Works, Gold, Copper, Iron, Lead, Manganese, Ruby, Salt and Coal Mines, Flour, Sugar, Oil, Rice, Saw, Bone and Paper Mills in India, Cotton Mills in China and Japan together with a number of useful tables for Mill and Factory Owners, Managers, Engineers, Carding, Spinning and Weaving Masters, Machinery, Hardware and Mill Store Merchants, etc.

The Directory cannot fail to appeal to Lancashire, Manchester, Oldham, American and other firms as a valuable medium for advertising their specialties, being freely circulated among the users of Textile and Engineering Machinery in India.



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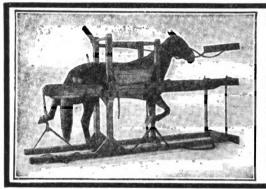


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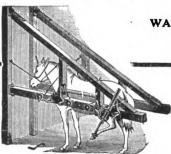
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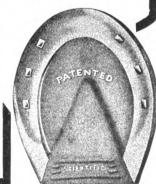
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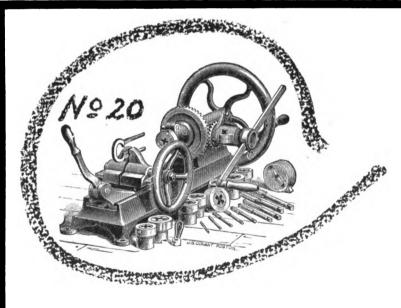


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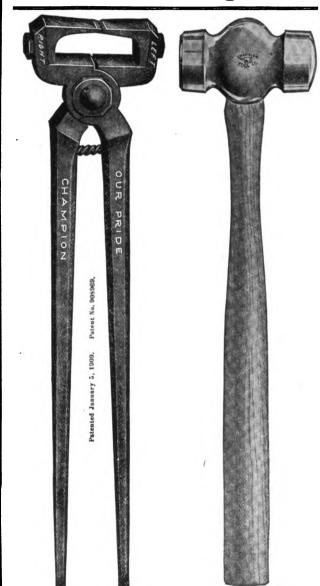
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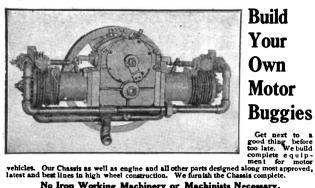
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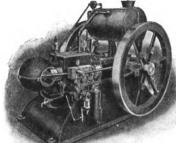
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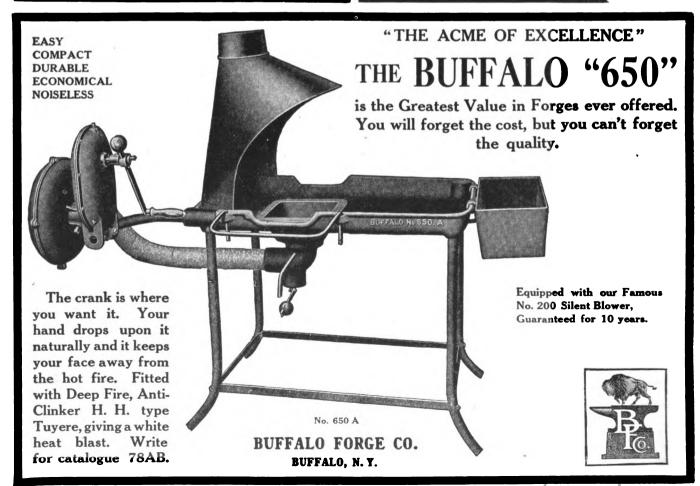
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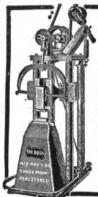




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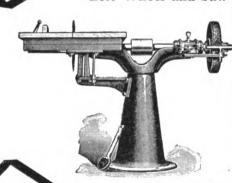
Write today for Complete Circulars.

Address.

HAMMER AND GRINDER DEPT.

KERRIHARD CO., Red Oak, Ia.

In writing mention "American Blacksmith"



COMBINATION SAW AND GRINDER

\$60.00

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Don't be bothered with a water tank and run the risk of aving a "freeze up" in cold weather. Order this engine n 30 days free trial without signing your name to any apers or binding yourself in any way whatever. We stand ack of it with a 5-year Guarantee. Ask us how we cool ithout a fan, and why we use one third less gasoline than ther makes. Address,

GADE BROS. MFG, CO., North High, Iowa Falls, Iowa.

THE PERFECT **POWER HAMMER**

The Only Hammer Made with extra long guides, insuring a direct vertical stroke of the ram.

The Only Hammer Made with a disk attachment with a special anvil for sharpening plow and harrow disks.

Made in three sizes:

2½ in. Sq. Ram, Wt. 30 lbs. 3 " " 40 " " " " 80 "

> Prices are right. Write any jobber or

MACGOWAN & FINIGAN FOUNDRY AND MACHINE CO.

ST. LOUIS, MO.

Vulcan Iron Works

(INCORPORATED)

Mason City, Iowa



Catalog free,

today

write

Universal Tenon and Boring Machine

for wagon repair shops. Cuts tenons on set of wheels in twelve minutes.



THE AJAX GAS AND GASOLINE S CONTROL OF S CON

For the small power user there are no better engines made. Their construction combines strength, simplicity and economy. Backed by the most accurate workmanahip, made of the highest grade of material, every part interchangeable, our engines give years of satisfactory service. Learn more about them. Our big illustrated catalog mailed free on request,

AJAX WORKS, IRON CORRY,



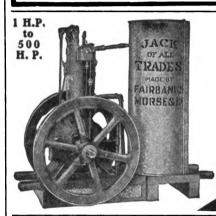
YOU'RE TIRED AND WORN OUT

From using that old-style Hand Blower. Get a Modern Electric

ROTH FORGE BLOWER AND ENJOY LIFE

· Write for interesting prices and bulletin No. 1611

ROTH BROS., 451 W. Adams St., CHICAGO, ILL. NEW YORK OFFICE: 136 Liberty Street.



SAVE HALF YOUR TIME AND MAKE MORE MONEY

Many of the farmers who come into your shop need gasoline engines; many others who could get along without one would buy an engine if they knew absolutely they were getting one that was dependable. How easy it would be with such an engine in your shop plugging away day after day for you to convince your customers of its merits. Not only would it save one half your time, but it would make selling easy.

Fairbanks-Morse Engines have proved their worth to over seventy thousand users in all parts of the world. We have a special proposition to make to you. Write now for our new catalogue and agency proposition, No. 487 AP.

FAIRBANKS, MORSE & CO. CHICAGO, ILL.



ACME Dry Batteries for Ignition

THE MOST IIMPORTANT THING NEXT TO GETTING GAS IN YOUR CYLINDERS IS EXPLODING IT

The fuller and hotter the spark, the better and stronger the explosion, and the greater the efficiency of your engine. If you use ACME DRY BATTERIES you can always depend upon a hot, fat spark, strong, full explosions, and the maximum of efficiency from your engine.

The Nungesser Electric Battery Co.

CLEVELAND, OHIO.

General Sales Office, 128 West Jackson Boulevard, CHICAGO





REMY MAGNETOS

Will start and run your Gas or Gasoline Engine without the aid of break or jump spark ignition. Information sent on request,

REMY ELECTRIC CO., Anderson, Ind.





"OUICK ACTION" **IGNITING DYNAMOS** Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils, Send for Catalogue B.

The Knoblock-Heideman Mfg. Co., SOUTH BEND, IND.

GASOLINE ENGINE BARGAINS

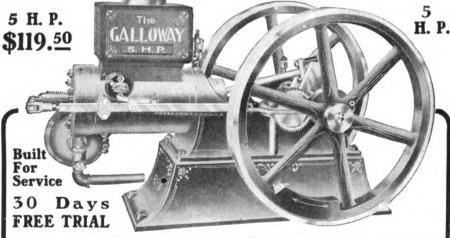
Our prices are from 30 to 60 per cent less than new outfits. All engines are thoroughly over-hauled and rebuilt. Guarantee given with each sale to repair or replace any part of engines giving out, owing to defective material or workmanship, during the period of one year from date of sale. We have a stock of more than 125 engines of many makes, ranging in size from 1 to 130 H. P. Here are a few of the engines we have ready for prompt shipment:

124 H.P. T. & M. or Simplicity
2 H.P. International or Palmer
224 H.P. Meitz & Weiss, kerosene
3 H.P. McCadden, air cooled
3 H.P. McCadden, air cooled
3 H.P. Webster, Gus, Holiday, Perfection,
Tuttle or Colborne
4 H.P. Witte, or Master Workman
5 H.P. White & Middleton, Otto, Milwaukee
or Holiday

6 H.P. McCadden, Otto, Brown, Colborne, Simplicity
7 H.P. Otto or Colborne
8 H.P. Foos or Otto
9 H.P. Stickney or Otto
10 H.P. Brown, Otto, Columbia, White & Middleton or Stickney
12 H.P. Otto, Brown or White & Middleton
15 H.P. Fairbanks-Morse, Otto, Lozier or Nash
18 H.P. Coffield, White & Middleton
20 H.P. Fairbanks-Morse, New Era or Callahan

Write and tell us how much H. P. you want and we will promptly quote you prices on the engines we have which would suit your requirements,

COLBORNE MANUFACTURING CO., 40 E. Indiana St., Chicago, Ill.



GALLOWAY GASOLINE ENGINE

Owned and Made Exclusively by the William Galloway Co., Waterloo, Iow

Owned and Made Exclusively by the William Galloway Co., Waterloo, Iowa will run your shop at several times its present capacity and enable you to take lots of jobs that you have to turn down now because you have not the capacity.

Only four things to do: Turn on the switch, turn on the oil, turn on the gasoline, give the fly wheel a start, and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs.

The Galloway has been classed as a standard, high-grade engine for 15 years. Over 2,500 in use in Iowa alone. Thousands in every other State and Territory.

If you try the Galloway engine, you will find that it is not overspeeded. Remember the bore and stroke counts and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake tests.

On the larger sizes, if it is not entirely convenient for you to pay all cash, I will take your note for the balance at the regular rate of interest for 6 months.

The price given is for the 5-horse power only, but we make these engines in seven sizes. Note my special proposition to blacksmiths.

I have a plan by which every blacksmith can partly or entirely pay for his own machine. It's good; it's away out of the ordinary; and you will be overlooking a big chance if you don't write for my proposition.

Ask for my free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure.

Ask for my free information on stationary and portable gasoline engines from with thorse power. We make the best, and we price them at a reasonable figure.

WRITE TODAY.

WILLIAM GALLOWAY, President.

THE WILLIAM GALLOWAY COMPANY, 577 Jefferson St., Waterloo, Iowa.



LET THIS ENGINE RUN YOUR SHOP

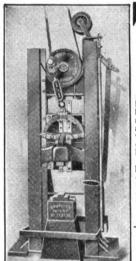


Only One Cent an hour per H. P.

hour per H. P.
No trouble. You start
it in the morning and
it will run till night
without any attention
whatever. You can stop
and start at will. No
delay. Power alway
ready, Drop us a line
and let us explain this
wonderful gasoline engine.

Strelinger Marine Engine Co.

Dept. A. B. 46 Congress Street E. DETROIT. MICH.



GRIFFITTS BELT POWER HAMMER

Every Part Riveted

It is the strongest most durable hammer made. hammer made. The best all-around ham-mer for blacksmith and wagon shops. It will not get out of order; will not work

This machine will help you do better, quicker and cheaper work. Get our full description and

WRITE TODAY

GRIFFITTS MACHINE WORKS,

107 Fremont Street,

SAN FRANCISCO, CAL.

THE DAYTON



SPRING CUSHIONED

A First-Class, Medium-Priced Machine. The Best Helper for Your Shop. Will Soon Pay for Itself.

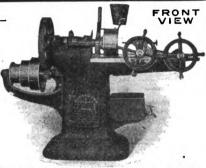
SEND FOR CIRCULAR. Sold through Supply Dealers, Mention your dealer's name.

The Foglesong Machine Co., 129 Ringgold Street, DAYTON, OHIO.



MERRIMAN Bolt Threader

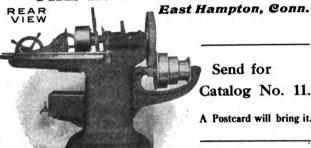
Best on Earth



A Bolt Cutter is Much Like a Man in This THE HEAD IS NEARLY EVERYTHING

The Merriman Bolt Cutter Head is noted for: Simplicity of The Merriman Bolt Cutter Head is noted for: Simplicity of the Head—only four parts. Great Durability—few repairs needed. Square Bearing of the Dies in the Ring. Solidity of the Dies like a Solid Die. Uniformity of the Product—Bolts all the same size. Effectiveness of Cheapest help can understand and run it. No machine turns out work more rapidly.

THE H. B. BROWN CO.,



Send for Catalog No. 11.

A Postcard will bring it.

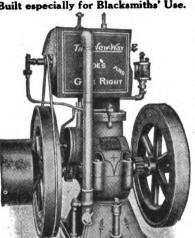
NOTICE TO BLACKSMITHS

THE WEYE WAY" Air Cooled

IS THE ONLY

GASOLINE ENGINE

Built especially for Blacksmiths' Use. 21/2, 31/2, and 6 H. P.



2½, 3½, and 6 H. P.

Look at the other engines first. Note the multitude of rods, springs and triggers described as simple. Remember that the water tank (always left out of the cut) has to be filled and emptied every winter day. To forget it once may mean a ruined engine. Remember that water-cooled engines all have packed cylinder heads. Packing leaks and blows out. Inevitable trouble and loss of power sometime.

Then look at an engine that IS simple One-piece cylinder—no chance to leak—grows stronger with use. Everything enclosed—no frail parts—no water—not a piece of packing or a gasket in it—no gasoline pump troubles. It absolutely cannot be overheated under full load—any temperature—any length of time. Your

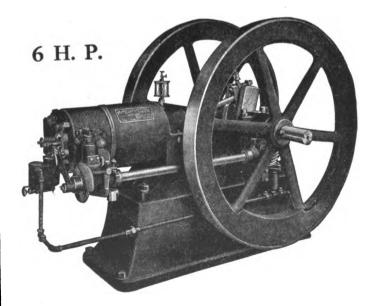
any temperature - any length of time. Your length of time. Y judgment tells you to

WRITE FOR CATALOG "K." DO IT NOW.

THE Wess-Way Motor Company Lansing, Michean U.S.A. 60 SHERIDAN ST.

GAS AND ENGINE

THE MOST RELIABLE HELPER IN A SHOP



Thousands of Blacksmiths using and selling WEBER ENGINES.

We have a special proposition to make you on a 6 H. P. Engine.

Buy Direct from Factory with 25 years' Reputation for Quality and Reliability.

Over 20,000 WEBER ENGINES in actual service.

Send for Booklet 103, "How to Buy the Best Engine."

WEBER GAS ENGINE CO. KANSAS CITY, MO. Address,

I. H. C. ENGINES AS Blacksmith's Powers

You are working at a disadvantage if your shop is not equipped with a good reliable power.

You have all kinds of work to do. Power on a good many of the johs is an absolute necessity.

Consider the matter carefully and you will discover the best of reasons why you should have an I. H. C. gasoline engine in your shop.

With one of these engines installed you will have the satisfaction of knowing you will have power whenever you need it. You will find it better than a line shaft because you do not have to pay for power you do not use. You start your I. H. C. engine going whenever you need power, There is no waiting. Power is delivered instantly. All the power you need will be generated and delivered at the lowest possible cost. And when your work is done you shut off the engine and stop all expense instantly.

An I. H. C. engine will not fail you. They are simple and easy to understand and they are built on right mechanical lines.

You have your choice of many sizes and styles of I. H. C. Gasoline Engines:

Verticals—2, 3 and 25-horse power Horizontals (portable and stationary)—in 4, 6, 8, 10, 12, 15 and 20-horse power Air Cooled Engines—in 1 and 2-horse power

It will pay you to investigate these engines. It will interest you to look into their superior materials and the superior way in which they are constructed. International local agents have these engines on sale. Ask them for catalogs of the style you are interested in, or write direct to us.

INTERNATIONAL HARVESTER COMPANY OF AMERICA (INCORPORATED)

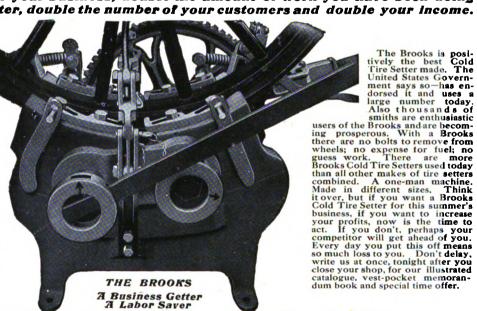
13 Harvester Building

CHICAGO, ILL., U. S. A.

BROOKS COLD TIRE

Will positively increase your business, double the amount of work you have been doing and do it easier and better, double the number of your customers and double your income.

Which shop do you think a customer prefers to patronize. the one with modern, up-to-date machinery, or the one with out? Thousands of smiths have doubled and tripled their business by getting Brooks machines. If a Brooks Cold Tire Setter will do this for other smiths, why not for you? You certainly will not admit these smiths are brighter or more energetic than you. These very men, before they bought Brooks machines, said just as you probably do now—"What, by putting a Brooks Cold Tire Setter in my shop I can increase my business? Nonsense." But, nevertheless, we persuaded them to get Brooks machines and their business did increase. People for miles around came to their shops with trial orders—some who had never patronized them before—and were so well pleased with the way the Brooks set their tires they continued to bring their tires setting jobs right along and brought their other work as well, Did it pay these smiths to get Brooks Cold Tire Setters? We ask, did it pay? Don't take our word for it. Read a recent letter from a successful blacksmith.



users of the Brooks and are becoming prosperous. With a Brooks there are no bolts to remove from wheels; no expense for fuel; no guess work. There are more Brooks Cold Tire Setters used today than all other makes of tire setters combined. A one-man machine. Made in different sizes, Think it over, but if you want a Brooks Cold Tire Setter for this summer's business, if you want to increase your profits, now is the time to act. If you don't, perhaps your competitor will get ahead of you. Every day you put this off means so much loss to you. Don't delay, write us at once, tonight after you close your shop, for our illustrated catalogue, vest-pocket memorandum book and special time offer.

To The Brooks Tire Machine Co.

Gettlemen—I have used your Brooks Tire Setter for some time and I consider it the only tire setter on the market for all classes of work. My competitors have other cold tire sectors, but I will frankly say that I am doing more tire setting than both of them. I have made \$7,00 an hour with my Brooks machine and think it one of the best investments I ever made, and have been in business for several years. I have people who come several miles and pay me more money to set their tires. Why? Because I have the machine that does the work and does not ruin their wheels, and I can charge extra for my work if I care to do so. When the people found out what nice work I could do, they came and asked me to set their tires in the Brooks Cold Tire Setter. With kindest regards. GRORGE I, PURVIS.

THE BROOKS TIRE MACHINE COMPANY

857-859 Ellicott Square BUFFALO, N. Y.

Write to nearest office

121 N. Water Street WICHITA, KANS.

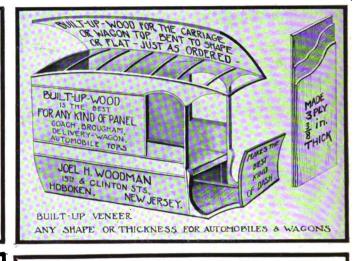


Threading Outfit that is suitable for general shop use—the "DUPLEX" Bolt Die Stock Set "A", range 4 to 3 in. It contains dies that adjust without a wrench and require no reversing when cut is finished. variety of sets with desirable ranges.

THE HART MFG. CO.

50 Wood Street

CLEVELAND, O., U. S. A.



T. E. McCOOK

PRACTICAL HORSESHOEING

See ads on pages 35 and 47.

Buffalo Forge 6.

The Buffalo portable down draft Forge no. 660 9 fought from you a year ago is a danly. The blower runs easier and quieter than any I have ever used and gues a stronger blast capable of the heaviest work . Resp yours 18 ne took

Riceville, Iowa, mar 6th 1909

Blacksmiths are just wild about it where it is used, and the manufacturers are either crazy or dead sure they have a "cinch" on the other fellows for they actually warrant it to be better than any other and will let you be the judge. GET ONE QUICK IF YOU WANT TO KNOCK OUT YOUR COMPETITORS. Write for information at once to

National Hydraulic Tire Setter Co.

KEOKUK, IOWA.



Say! Mr. Blacksmith.

have you heard about the new tire setter called

THE SCIENTIFIC

"Rochester"

Helve

Hammer

'The

Hardest

Hitter"

For catalog address,

THE WEST TIRE SETTER CO., Rochester, N. Y.



Our Taps and Dies are the best that 34 years' experience and up-to-date methods can make them. The easiest cutting and longest wearing screw cutting tools made. Send for free catalog.

J. SMART MFG. CO., Greenfield, Mass.

HAY - BUDDEN SOLID WROUGHT

FIRST MADE IN AMERICA

The Gold Medal Anvil HIGHEST AWARD

OMAHA, 1898 PAN-AMERICAN, 1901

Every genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with the best Crucible Cast Steel. Every genuine "Hay-Budden" Anvil is made by the latest improved methods.



Over 150,000 in Use

ANVILS

WARRANTED WEIGHTS FROM 10 to 800 LBS.

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality, Form and Finish to any others on the Market.

BROOKLYN, N. Y. HAY-BUDDEN MFG. CO.,

THE

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NUMBER M

AMERICAN BLACKSMITH

BUFFALO N.Y. U.S.A. A Practical Journal of Blacksmithing and Wagonmaking

IULY. 1909

\$1.00 A YEAR 10c A COPY



DON'T FORGET HOW WELL THE

BOSS EXTRA LIGHT IRON SNOW SHOES

Suited you last winter—they are better than ever and are

MADE IN SIZES 1 to 5 Inclusive.

WRITE FOR SAMPLES.

The popularity of BOSS horse and mule shoes is due to their superior quality.

VARIETY We make shoes for all purposes.

WRITE FOR CATALOGUE.



PRYDEN HORSE SHOE COMPANY, CATASAUQUA, PENNSYLVANIA.

Silver's Drills, Forges, Band Saws, Jointers, Hub Boring and Spoke Tenon Machines

Trying to find better tools than the kind we make is like trying to find the North Pole—you can't do it, not yet.

No mushroom growth about Silver's Tools. Since 1854 we've been right here in the same place. Fifty-five years of "brain soaking" in the best materials and the best way of working them together couldn't result in any other but the best machines.

We can't explain here just why this is so, just why Silver's Tools bulge out with Quality, because our space does not permit it. But our 1909 loose leaf catalog explains why. So do the booklets.

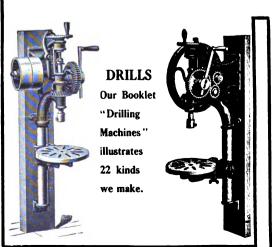
And they're waiting to call on you if you will send your name and address.

The time to act is now, while the matter is fresh in your mind.

The SILVER MFG. Co.

365 Broadway

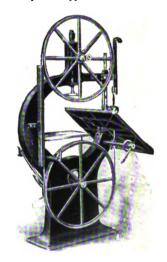
SALEM, OHIO







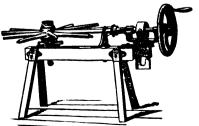
SILVER'S NEW JOINTERS
Five Sizes—8, 12, 16, 20 and 24 inch.
New "patent applied for" features.



SILVER'S NEW BAND SAWS

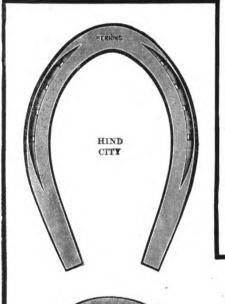
Four Sizes—Patented tilting device for table—All parts easily reached by operator—New ratchet foot power device on 20 inch machine.

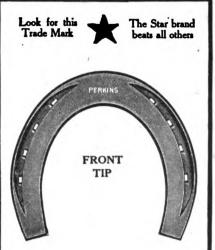




SPOKE TENON MACHINES
Seven Sizes, Fitted with Star Hollow
Auger. Rigidly constructed.

Digitized by GOOGIC



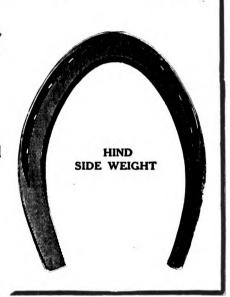






★PERKINS★ HORSE SHOES TOE CALKS The SUPERIOR Kind

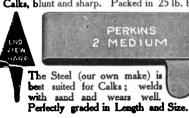
Have more points of superiority than any other make. An upto-date shoe for upto-date Blacksmiths.



Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send COMPLETE CATALOG AND SAMPLE FREE

PERKINS

Made in Medium, Long, and Extra Long, both blunt and sharp, also Medium Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.



WRITE TODAY.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.





PERKINS
2 LONG

The Prong does not enter and weaken the Shoe at the crease. The



MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY PROVIDENCE, RHODE ISLAND.



Universal Wood Worker, fitted up with the Single End Tenoning Attachment, with traveling table and hold down lever.

Screw is 5 in.

in Diameter.

PRICE, \$85.00

Weighs 800 lbs.

The four cuts illustrated on this page will give you a fair idea of the construction of the FAMOUS Universal Wood Worker. which is especially adapted for the blacksmith and wagon maker's trade where both SPACE and ECONOMY is necessary.

Write us at once for our catalogue E, giving you a complete description of the FAMOUS machine, explaining all of the different attachments which can be furnished, and are most desirable for the wagon makers' and blacksmith trades. If wagon makers and blacksmith trades. If in. wide: also arranged for doing two side molding, matching and sticking. you are a blacksmith or wagon maker you cannot afford to be without a machine of this kind, the only machine on the market which will save you from 15 to 20% of your labor, which will pay for the machine the first season,

We would also be pleased to send you our general catalogue.





SIDNEY TOOL CO.

SIDNEY, OHIO

U. S. A. Universal Wood Worker, fitted up with Jointer. Shaper and Two Side Molder.

You are a Mechanic. WILL YOU DO THIS? Please compare the cut of MAYERS COLD TIRE SETTER

with all others. You can see at a glance how it works and understand it. No fixings, ginger bread or banjo work to adjustor break. The MAYERS is as simple, as good, as solid, as powerful and as durable as it looks. About twice as heavy as other machines and every piece and part warranted steel. Both heads (right and left) are on a 5" screw and REALLY do what others FALSELY claim: PULLS BOTH SIDES. While others do set tires and satisfy some people, and they honestly indorse them, yet that does not disprove that the MAYERS is in a class all by itself for QUALITY of work. We will prove it. Are YOU afraid of your own JUDGMENT? We are not. Will YOU believe YOUR own eyes? No matter what your OPINION is NOW, a trial of this machine will convince you that it does set tires PERFECTLY, because it has the

RIGHT PRINCIPLE, drawing both sides at the same time. The trial will convince you. The price is about one half of the others. The terms are easy. The guarantee is ironclad. What more could a PARTICULAR, careful man want?

The letter below is one among the thousands we have:

Hastings, Okla., May 10, 1909.

MAYERS TIRE SETTER MFG. CO.,

St. Louis, Mo.

Dear Sirs:—We have used one of your setters since April, 1907, and have set about four thousand (4,000) tires, from the smallest buggy tires to its capacity, and it's as good as new.

The keys have never even been sharpened.

As for speed, we are willing to demonstrate with any man on any make of setter on earth.

Now, we don't think we are biased in this, for we have used most all makes.

They all beat the old way, but the MAYERS we believe is the best tire setter now made. It is fool-proof. It never kinks a tire and is as strong as can be made.

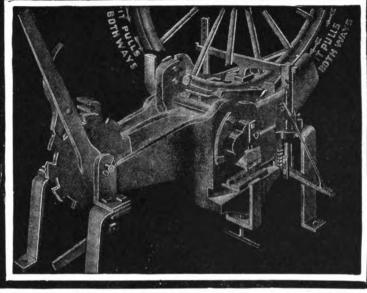
RISLEY & PARKER.

Every piece and part is Steel. MAYERS TIRE SETTER MFG. CO., 4028-4030 Forest Park Boulévard, St. Louis, Mo. P. S. WE MAKE A DISHER that YOU NEED. Write for cut of it.

The Cogs are

extra quality Steel

NOT ONLY THE BEST



BUT ALSO THE CHEAPEST

EXTEND YOUR TRADE, INCREASE YOUR PROFITS, INSTALL A HOUSE COLD TIRE SETTER IN YOUR SHOP NOW.

The HOUSE is the one to buy, and don't be deceived by big sounding ads, for some men have no regard for truth, and besides, if required, you can try ours in your shop at our expense, though your neighbor likely has one, for there are about 3,000 in use. This is the real proof, also, that ours are the best, for if others are as good they would have as many in use. They certainly advertise the biggest.

The following evidence shows why men buy ours:

The House Cold Tire Setter is a Money Maker—Before I bought one seven years ago, I was poor and working in my shop alone, but now I work 18 men and have built a good two-story brick shop. The House Cold Tire Setter is responsible for it all. It has certainly kept the clear dollars dropping into my pocket.

A. B. GARBER.

They Never Wear Out—I have used my House Cold Tire Setter constantly for 7 years. It has never been out of fix, nor cost me one cent for repairs and I would not sell it for any price if I could not get another.

F. H. BRIGHTBILL.

Dallas, Tex., Dec. I, 1907.

The House Cold Tire Setter is a Trade Getter—I bought one in 1904, prior to that time I had very little work, but after that I had worlds of it—for instance, I set 4,000 tires the second year and I got their other work, too, don't you forget it. I have set 117 tires in one day.

L. D. BUSBY.

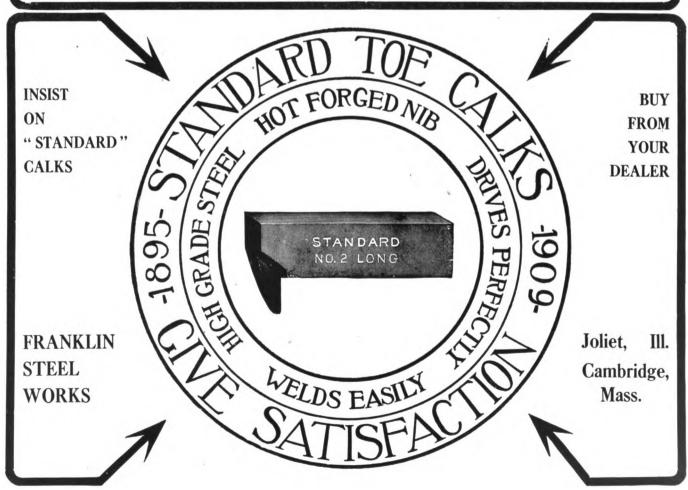
Ft. Sam Houston, Tex.

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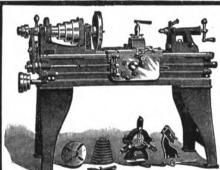
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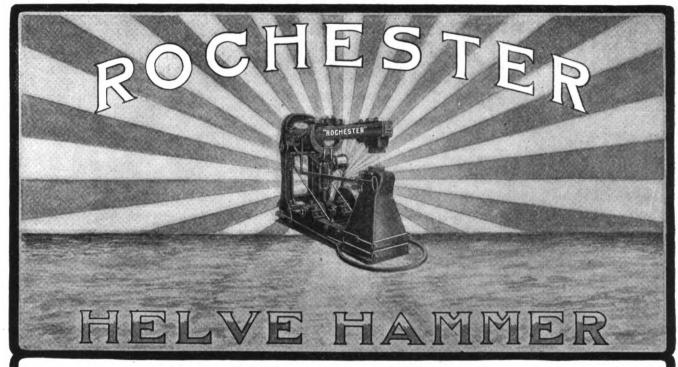
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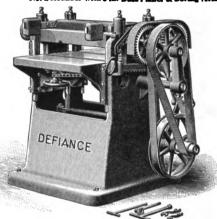
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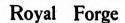
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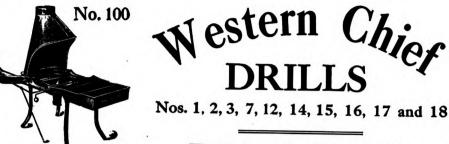
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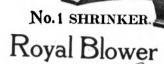
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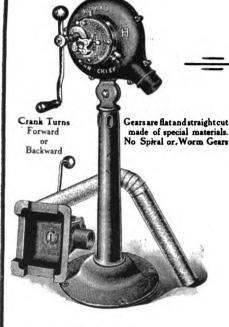
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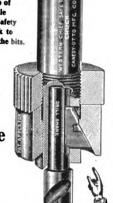
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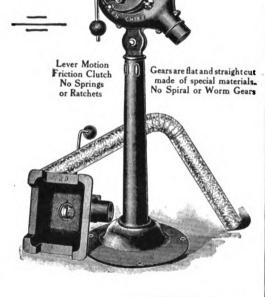




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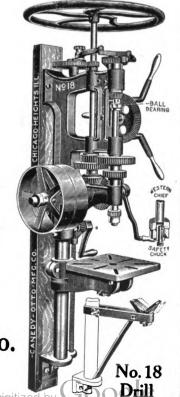
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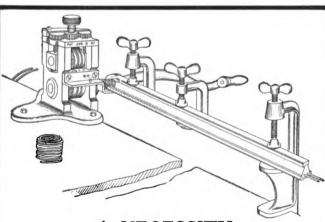
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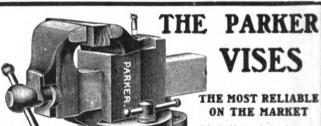
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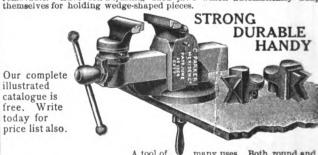
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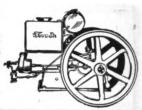


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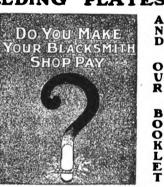
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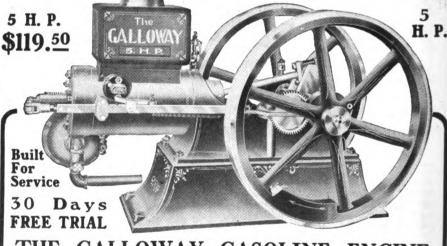
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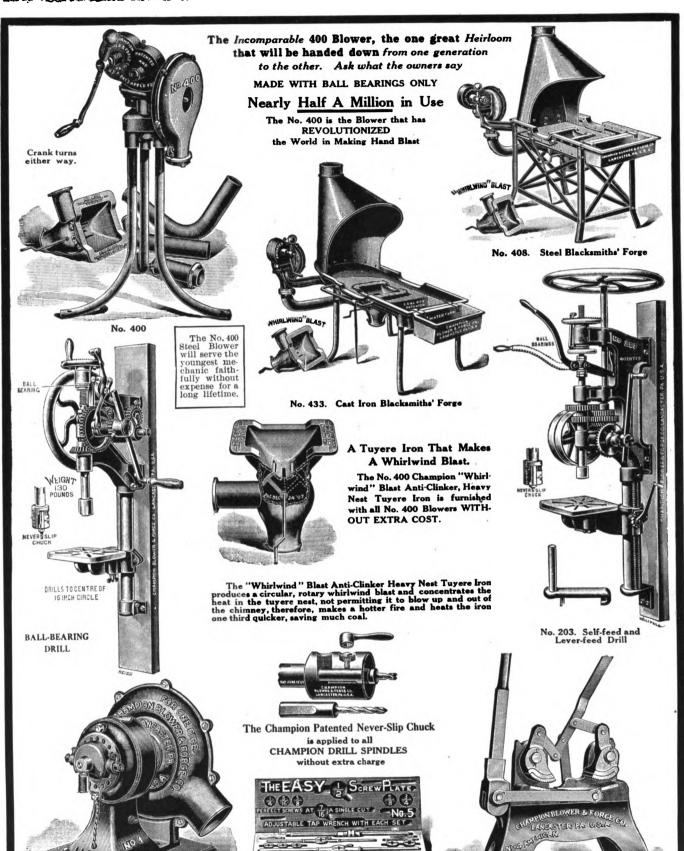
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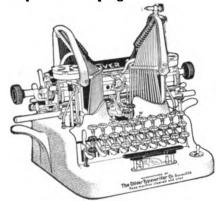


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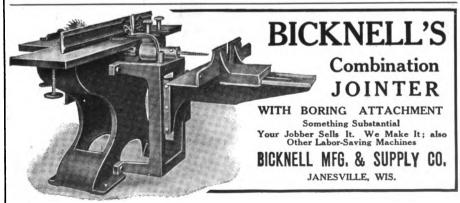
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Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in American Blacksmith advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.









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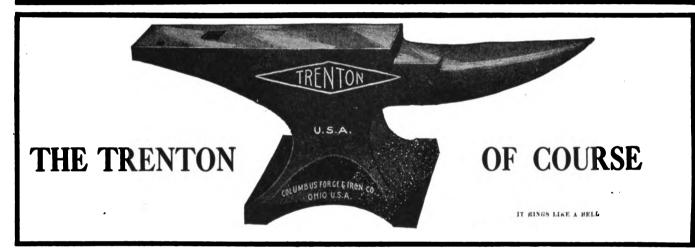
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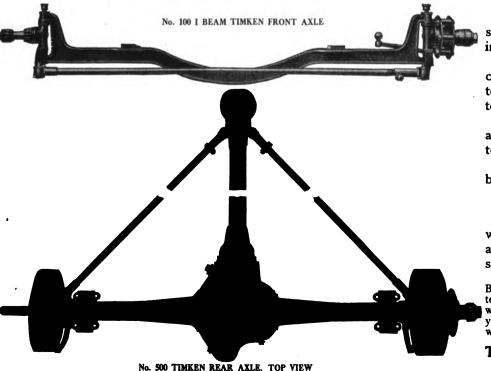


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Gibraltar.

"I think your paper and business methods are of the very best quality and built on a foundation substantial as Gibraltar."

That is an extract of a letter recently received from a Nebraska smith. We want you to think of "Our Journal" as a Gibraltar. as a protector, as a staunch business institution that has the welfare of the craft always at heart. We want you to know that our guns are always loaded for protecting the interests of the craft against unscrupulous dealers and manufacturers. We want you to think of "Our Journal" as a Gibraltar in strength.

Then we want your help and co-operation in keeping "Our Journal" strong, and in making it stronger. Every single new subscriber adds to our strength. Every one of "Our Folks" can help. And we make it worth your while to help. We'll give you six months' credit on your own subscription account for every yearly subscriber that you send us. Why not get your own paper free of charge? If you send us but ten new subscribers you get the paper for five whole years without charge. Think of The American Blacksmith as a Gibraltar of strength and then tell your neighbor and get his subscription.

How Are Your Buffaloes?

Is your stock low? Are you using them freely? Remember that their use insures you of the protection of "Our Big Stick." Use them freely on correspondence to jobbers, manufacturers and to brother smiths. Your brother craftsmen will be glad to know that you read "Our Journal" and belong to "Our Folks." Don't ever allow yourself to run out of the little pink squares. Don't ever allow a letter to go into the mail without one of "Our Buffaloes" on it. We have a big supply and we want you to ask for more before you are entirely out of them. A postal will do. Or, if you have the time, write a letter for publication at the time of requesting more pink stamps.

Contents, July, 1909.

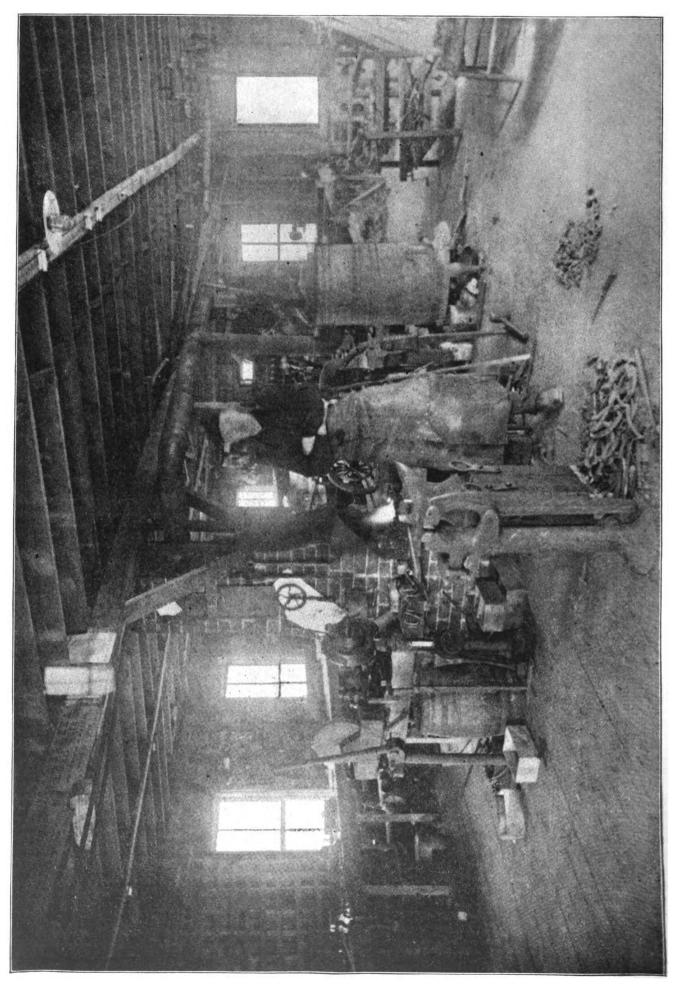
Lighted by Electricity—Interior of Rix Brothers Shop, Massachusetts Frontispiece Planning, Building and Equipping the Brothers Shop, Massachusetts Frontspiece Planning, Building and Equipping the Smith Shop. A Colorado Smith Shop with Electric Equipment... A General Shop of Southwestern Texas... A Well-Equipped Massachusetts Shop... A Well-Equipped Missouri General Shop. A General Shop of Oregon. An Iowa Shop Run by Electricity. A General Shop of Texas. Burned Tool Steel... The Smith and His Work—4 The Implement Repairman. 223 226 227 227 227 227 228 228 The Implement Repairman. Gun and Novelty Repairing—7 A Handy Anvil Helper. The Apprentice Question—5. $\frac{232}{232}$ 233 Around Our Forge Fire The Builders (A Poem) 234 Heats, Sparks, Welds... American Association of Blacksmiths and Horseshoers..... Horseshoers The Horseshoer Interfering in Deformed Horses Fitting the Shoe and Shoeing the Horse Inflammation in the Horse's Feet. That Ideal Bearing. Shoeing a Horse with Ringbone. To Know or Not to Know Anatomy. The Machine and Tool Smith. A Practical Method of Forging Crank Axles Treating High-Speed Steels. A Crane for Handling Heavy Work. How to Weld Axles or Heavy Iron Easily The Automobile Repairman. The International Auto Buggy. Adjusting, Repairing and Caring for an Automobile. Forging Well-Drilling Jars. How I Build Manure Spreaders. 235 237 237 237 237 237 237 238 238 239 How I Build Manure Spreaders..... tilizing Waste Heat . pueries, Answers, Notes For Tempering Plows Shoeing for Paddling A Note from Kansas Tempering Plow Shares From British Columbia Cement and Concrete To Fasten Machines to Concrete Floors To Toughen Plow Shares A Letter from North Carolina A Missouri Shop A Shoeing Hint An Iowa Price List Just a Few Thoughts Some Alabama Prices The Apprentice Question Examination Laws and Licenses An Interesting Idaho Letter That Well-Drilling Jar A Letter from Georgia A Practical Talk on Shoeing The Apprentice Question How to True a Grindstone A Talk on Cold Tire Setting An Interesting Southern Letter On Prosperity and Gas Engines 243 243 243 243 243 243 243

Our Shop Number.

And now comes our third annual shop number. Previous editions of the shop number have proven very popular with "Our Folks," and we' believe there are plenty of reasons for calling this number the best of all. We say this not in a desire to praise our own work, but to show our appreciation of the kind co-opera-tion of "Our Folks." For, without your help, this number would be impossible. We want to thank you for your help and for your assistance. If you find anything the matter with this issue we want you to tell us what it is. If you have a criticism to offer, write us fully about it. Then, too, we like to know when we've done things to suit you. A suggestion or two may help us to make the fourth number still better. Will you tell us what you think of this issue?—the third annual shop number. Will you tell us what you think of each number as it is published? We want to improve constantly and we can't do so if we don't know how you like the paper. Tell us what you would do if you were in our place.

Be a Booster.

Are you boosting the craft? Are you talking good craft talk? Are you helping the craft to a better place in the minds of the people? The trade that has given you employment these many years, the trade that has enabled you to live and to clothe and to feed your family, deserves praise at your hands. Let us all co-operate to make the craft still better. Look upon the good old trade, of our fathers, with larger eyes and broader thoughts. Put into the craft the best that is in you and get out of it what you deserve—a good living, honest profits and a just success. Get the spirit of the good old craft. Talk, preach and shout loyalty. Boost continually, persistently and everlastingly for the good old trade. If you do it and every other loyal craftsman does the same, we'll have a trade that will more-than ever be classed among professions higher up. Let us think on these things.



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A NEAT GENERAL SHOP OF NEW JERSEY OCCUPIED BY MR. J. B. FLANNERY



THE NEW CEMENT SHOP OCCUPIED BY MR. W. Q. WATERHOUSE OF NEW JERSEY

Planning, Building and Equipping the Smith Shop

NE CAN hardly overestimate the importance of carefully planning the shop, properly building it when planned and then equipping it practically. The day when any old shack with a roof on it could be used to carry on a prosperous smith-shop business is fast passing. Careful thought must be given to the planning, building and equipping of the modern smith shop.

It is, of course, impossible to suggest a plan that will be found perfect for all shops. There are too many matters to be considered in each particular case. The suggestions following are not by any means offered as ideals, but the hints will no doubt be of material assistance to the smith who is about to plan a new shop or to remodel an old one. The many photographic engravings will no

doubt also be of material help in planning, building and equipping the modern smith shop.

Laying Out a General Shop.

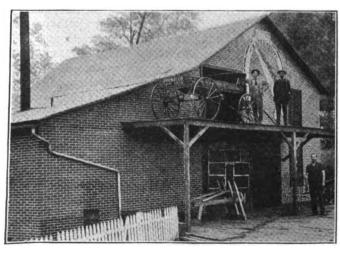
PAUL V. BURGESS.

In these days of modern blacksmithing we find that the shops that were large enough to meet the requirements of our forefathers are entirely inadequate for those of us who are trying to keep pace with the times. I shall endeavor to present my ideas for the consideration of the readers of THE AMERICAN BLACK-SMITH, hoping that they may be of benefit to some brother who is contemplating the erection of a shop.

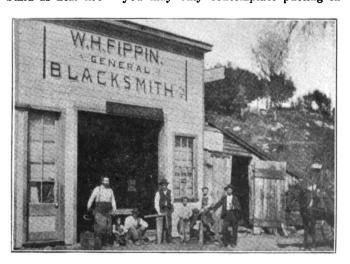
There are several things to take into consideration in laying out a shop, such as exposure to fire, insurance rates, etc. It is good policy to build as near fire-

proof as possible, especially in towns of large size. And insurance rates in a modern fireproof building are not more than one fourth what they are in a frame building. Brick and cement blocks are the best materials to use and if the right methods are employed they cost no more than a frame building. Either of these with a sheet-iron ceiling and fireproof roof represent the very latest in shop construction. As to the floor, the front part, where the horseshoeing is done, is best if made of two-inch oak board. In the rear, where the high-priced engine. saws, planers, lathes and the like are to be installed, it is best to first place the machines on a concrete base and then concrete the floor. Your machines are then perfectly safe from fire.

Be sure to allow plenty of room. While you may only contemplate putting in

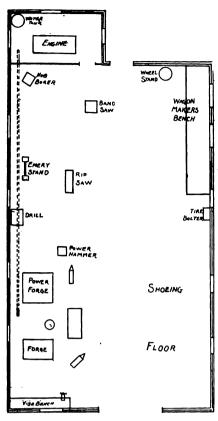


A PENNSYLVANIA GENERAL SHOP, RUN BY HAYES NEVITT



MR W. H. FIPPIN'S GENERAL SHOP OF CALIFORNIA

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SHOP LAYOUT BY MR. BURGESS

three or four machines now, in the near future you may want to get more and then find you have no room for them. For the two-fire shop, 35 by 75 feet is about right and if the tools are arranged with an idea to economize floor space plenty of room will be found.

From past experience we find it best to put the engine in a small shed room at the rear of the shop. It saves much valuable room and the engine is more easily cared for and kept clean. In the accompanying diagram you will notice that we run the line shaft along the wall on the same side the forges are located on. By putting the drill, emery stand,

rip saw and jointer close to the wall the middle of the floor is left for vehicles, plows, etc. We find after operating a shop by power for seven years that it is the only way and if we had to return to the primitive methods of a few years back we would give up the job.

Building and Equipping the Smith Shop. C. W. METCALF.

The first thing to consider when planning for a building is the foundation. It needs more than 6 by 6 or 8 by 10 pine timber. It wants the solid rock which will stand the racket. If you know what kind of machinery you are going to put in figure on the amount of space that each machine will require, the proper place for it and where they

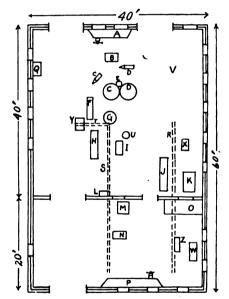
space that each machine will require, the proper place for it and where they will be the handiest to get at with all kinds of work. The next important thing is the necessary light; where it is needed and to what extent.

Referring to the illustration, the shop is 40 feet wide by 60 feet in length, with a partition, which leaves the main room 40 by 40 and the wood department 40 by 20 feet. The front has three windows, which are 3 feet in width and 2 doors, which are 8 feet in width. The west side has five windows, each 2 feet 6 inches wide, while the east side is the same. The smith's work-bench, A, is between the two doors, while the shoer's anvil, D, is 7 feet from the bench and 17 feet from the west wall. His forge, D, is 16 feet from the wall and $5\frac{1}{2}$ feet from the center of his fire pot is the center of his anvil.

The repair smith's anvil, C, is 8 feet from the bench and 14 feet from the east wall, with a leveling block, B, between the anvils and the bench. The two forges are set together with tank, E, between them. The trip hammer, F, is the same distance from the center

of the forge as his anvil, with a good passage between to allow a person to pass between them easily. The drill press, G, is 6 feet from center to the center of the repair forge. The other machines can be advantageously placed by any one experienced in shop work. At H is the disc-sharpener; I, the emerystand; J, the iron lathe; K, iron planer or shaper and L, the tire-bolting machine.

In the woodworking department M is the band saw; N, the wood planer; O, the engine room; P, the woodworker's bench; R, the main shaft from the engine; S, the counter shaft which passes through the center, from the wood planer to the drill press and T is a short counter shaft, which runs at right angles to the shaft S, and runs the drill press G, the power hammer F, and the



SHOP PLANNED BY MR. C. W. METCALF

power shears Y. The stove is shown at U, at V the shoeing floor, W represents the wood lathe, X the cold tire setter, and Z is a spoke tenon machine. At Q is a tire shrinker in case you desire to shrink a tire and set it in that manner.

Some may wonder why I put it in that short shaft, running at right angle to the other. My reason is to get my machines in their proper place to work at and be handy and to occupy the least room. With this style of building you can drive a team and buggy in the east door and down around the disc-sharpener and out the west door, or you can drive straight through and out the rear door of the wood department. This style of building makes it handy to get your work in and out of the shop and gives the smith plenty of room to do his work and not be crowded.

Have your fires run by a power blower.

Do away with old bellows and as long
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SHOP AND FORCE OF MR. F. K. GELWIX, OHIO

as you have power in the shop run your fire with it. It will make you a dollar a day more money and you have both hands to work with; and at night you are not all tired out from pumping wind for your fire. You can't get too much light in a shop. If you have plenty of light you can do your work better and quicker and not ruin your eyes. Light is the first thing to consider after the foundation, and the next is the placing of the machinery. The paint department is located on the second floor and all wood stock should also be kept on the second floor, where it is free from moisture.

Planning the Smith Shop.

When planning a smith shop building the land upon which the shop is to stand must necessarily be considered. The plans I submit are for a corner, which to my mind is the best location that can be secured. In the plan A represents the engine room in the woodworking department. The engine room should be enclosed with a combination wood and glass partition, so as to have plenty of light in the engine room. The machinery in the wood shop

circular saw, the band saw alone will do, as one can do almost anything on a good band saw. The planer should be fitted with several sets of knives, beside



AN ARKANSAS GENERAL SHOP

the straight ones, as almost any kind of moulding can be gotten out with it. The wheel horse, G, is portable, it being fastened to the floor simply by a ring in the floor and a long-shanked hook. The two work-benches B, B are both fitted with vises.

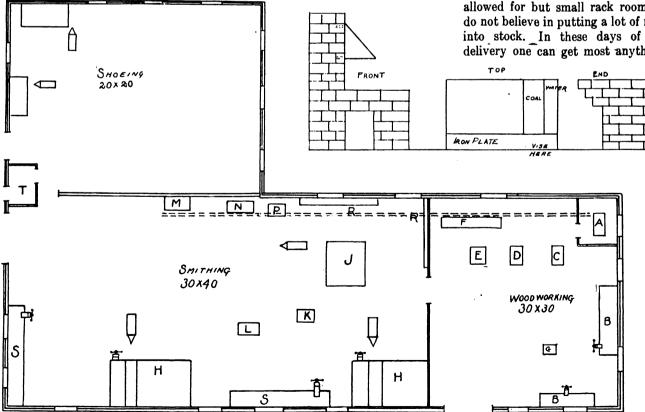
The smithing department contains three fires, two, H H, against the wall, and one toward the center of the shop. The latter is for heavy work and should be fitted with a telescope hood, so as to give one plenty of room. The anvil

the forge, J, but not so close as to be in the way. At L is an upsetting machine; M, a tire-bender; N, a shears; P, a drill; R, R, stock racks and S, S, work benches with vises.

I have placed the shoeing department by itself. I do not think it good policy to have shoeing on the same floor with wagon work, as there is always more or less noise which tends to disquiet the horses. The office, T, I have placed at the end of the shop, as it gives a good view of all departments. Many smiths do not think an office is necessary, but it adds dignity to the concern and then, too, it provides a neat place into which to take a customer.

I also include a sketch of a brick forge, which I like very much. The hood over the fire is removable so as to make room for large work. The front edge extends beyond the body of the forge. This is for comfort, as there is nothing I dislike more than to be kicking my toes against the brick. It is also handy when a crooked piece is placed in the fire.

As to machinery, I do not recommend any particular make. All have good points and one must pick and choose to meet one's particular needs. I have allowed for but small rack room, as I do not believe in putting a lot of money into stock. In these days of quick delivery one can get most anything in

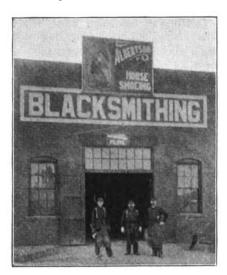


THE GENERAL SHOP PLANNED BY MR. POPE. ELEVATIONS AND PLAN OF MR. POPE'S FORGE ARE ALSO SHOWN

consists of a circular saw, C, a band saw D, a planer E, and a drill lathe F, which can be fitted up to tenon spokes. If one cannot have both a band and a

for this forge should be placed on a heavy cast-iron block, so it can be placed in any position for convenience. The power hammer, K, should be placed near the shape of stock in a few hours; so let the merchant carry your stock.

In placing the anvils you will notice that if located as shown the smith will not need to turn half way around to place his stock on the anvil. He has a chance to get his stock on the anvilbefore it is cold. The smith simply takes a quarter turn to place his stock



A COLORADO SHOP EQUIPPED WITH ELECTRICITY

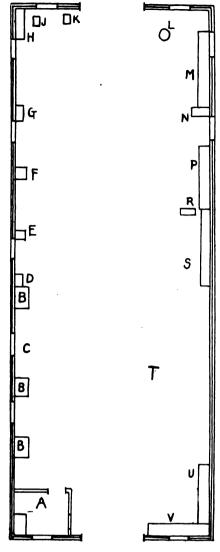
on his anvil. The position of the forges in the shoeing department allows plenty of space for the shoeing floor and for waiting horses. The vises on the two forges in the general smithing department will be found very handy for the smiths.

A corner shop built on these plans will, I think, meet with entire satisfaction. The machines and equipment are placed to best advantage and where they will be handy for most of the wook performed on them.

A Colorado Smith Shop with Electric Equipment.

J. E. ALBERTSON.

The engravings show a floor plan and also an exterior view of my shop. The shop is equipped with electric



THE FLOOR PLAN OF MR. J. E. ALBERTSON'S SHOP

lights, electric motor and blower for the fires. I employ three or four men most all the time and do a general smithing business, horseshoeing and vehicle work of all kinds. The shop is built of brick and we have a brick floor.

The following letters refer to the floor plan: A is the office; B B B represents the forges; C is a tool-rack; D, electric

motor and blower; E, tire bolter; F, drill; G, tire bench; H, tire heater; I, emery wheel; K, grindstone; L, wheel bench; M, wood bench, with vise; N, hub borer; P, iron work bench, with



A GENERAL SHOP IN THE NEW STATE— OKLAHOMA

vise; R, shear; S, iron rack; T, shoeing floor; U, bolt rack; V, thread-cutting bench, with vise. The shop is 24 feet wide by 80 feet long.

A General Shop of Southwestern Texas.

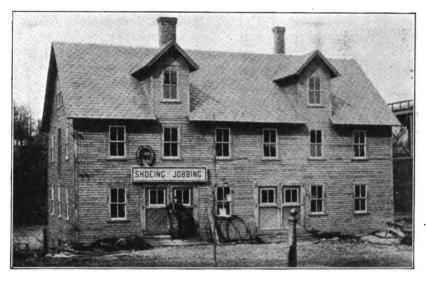
J. J. SCHAUMLOFFEL.



A YORK STATE GENERAL SHOP, RUN BY MR. J. P. McGUIRE



A LOUISIANA POWER SHOP, RUN BY BROTHER J. S. CORNWALL, JR.



RIX BROTHERS' GENERAL SHOP OF MASSACHUSETTS

 .Wagon spokes, each
 \$.25

 Wagon tires, new, per set
 12.00

 Buggy tires
 from \$7.00 to 8.00

 Buggy spindles
 from 6.00 to 7.50

 Plow sharpening
 .15 to .30

 Time work, per hour
 .50

I have been a reader of THE AMERICAN BLACKSMITH for six years and would not take three times the cost of "Our Journal" and do without it.

A Well-Equipped Massachusetts Shop.

RIX BROTHERS.

The accompanying engravings show our new shop, 26 by 50 feet. We run a general repair shop and fix everything, from an automobile to a teapot. We have a three-horsepower Olds gas engine, a bench saw, a band saw, a buzz planer, a power bolt-cutter, a power drill and a horse clipper. We think we have the handiest shop around here. We have both forges at one chimney and use two Western Chief blowers. We also have a Wyman toe calk machine. It is a great help on calks. You can make any size and length.

A Well-Equipped Missouri General Shop.

C. S. GATCHELL.

The accompanying engraving shows the ground plan of my shop, the machines and their location. I do all kinds of smith work—shoeing, plow work, disc sharpening, lathe and machine work, carriage painting, repair harness and gas engines. Besides this, I deal in buggies, wagons, farm implements, such as mowers, binders, etc., also carry house paints, lap-robes, harnesses, whips, and farm supplies of all kinds.

The following is a list of my tools and machines, which are located as shown in the ground plan. The upper story of



A GENERAL SHOP OF TEXAS

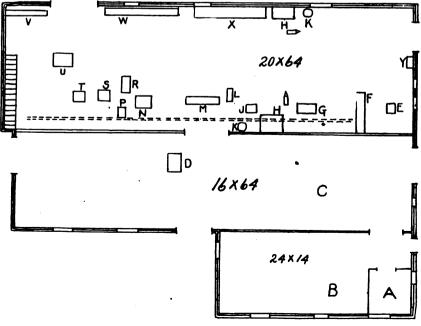
the shop is used as a stock room and a trimming shop. In the engraving A is the office; B, the harness rooms; C, the implement and vehicle store; D, the gas engine; E, tire shrinker; F, iron bench, with vise; G, trip hammer; H, H, forges; U, emery stand; K, K, drills; L, punch and shear; M, disc-sharpener; N, planer and rip saw; P, band saw; R, sand belt machine; S, 24-inch planer; T, hub-boring machine; U, shaper; V, wood lathe; W, screw-cutting lathe; X, wood bench; Y, tire bolter. The harness room is 14 by 24 feet, the implement and vehicle store 16 by 64 feet, and the blacksmith shop is 20 by 64 feet.

I enjoy reading THE AMERICAN BLACKSMITH very much. I also take the other blacksmith papers, and the gas engine magazines. They are all good, but "Our Journal" is one of the best blacksmith publications I know of.

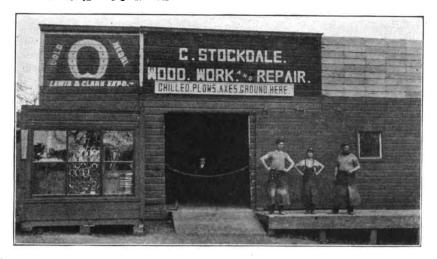
A General Shop of Oregon.

T. O. STOCKDALE.

The accompanying engraving shows our shop and working force. We have a power equipment, consisting of a three-horsepower engine, a trip hammer, an emery stand, a drill, a grindstone, a buzz saw, a punch and shear, a power blower for two fires, a shoeing rack, a tire shrinker, a tire bender, a tire puller, a hub-boring machine and a complete set of wagon and carriage tools. We do general work, but most of our work is shoeing. Mr. C. W. Stockdale won a gold medal at the Lewis and Clark Exposition and also three first prizes for the championship of Oregon. He will go to Seattle this year to try for a prize at the Alaska-Yukon-Pacific show. He



THE GROUND PLAN OF MR. C. S. GATCHELL'S WELL-EQUIPPED SHOP



THE GENERAL SHOP OF MR. STOCKDALE, A WINNER OF GOLD MEDALS

has traveled all over the States for the past eight years, shoeing horses at fairs and large cities.

An Iowa Shop Run by Electricity.

MARTIN FAKTOR.

The engraving shows an interior view of my new shop, which I built a year ago. It is 60 by 36 feet. I have three fires, which are in the center of the shop, as shown. They are run with an electric blower. I also have a six-horse-power electric motor with which I run the machinery. We have modern tools and plenty of them for our work. We do all kinds of wood work, blacksmithing and vehicle work. I have three good helpers. I have been in this business for thirty-three years and know every step, from bellows to electric blower.

A General Smith Shop of Texas. w. p. livingston.

The engraving shows the exterior of my shop, working force and myself.

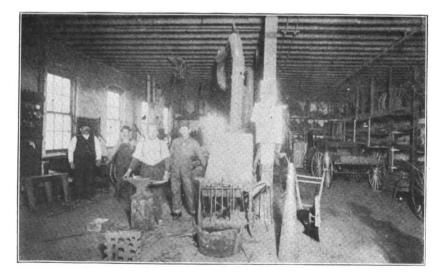
My shop is sixty by one hundred, and ten feet and is an iron-clad building. I have two electric motors, one six horsepower and one twelve and a half horsepower. I have six fires, one modern power hammer, an emery stand, a drill press, a lawn-mower grinder, a disc grinder, a No. 2 Little Giant shear, two tire setters, one tire bender, a power grindstone, a 36-inch band saw, a 12-inch hand planer, a rip saw, an eight by twenty surface planer and one power spoke-tenoning machine. For the shoeing side I have a Barcus shoeing stock with two foot clamps and all the bad ones look like Mexican money when we get them in the stocks. We are doing a good deal of business for this time of the year and in the face of bargain-counter prices, too.

as.

Burned Tool Steel.

ETHAN VIALL.

of A great deal of misleading information has been published regarding the ex-



AN ELECTRIC POWER SHOP OF IOWA, RUN BY MARTIN FAKTOR

tensive and irreparable damage done to tool steel by overheating. It has been talked and written and drummed into us that there was no possible remedy for "burned steel."

Of course, no man who really knows his business will habitually burn steel, but accidents happen in this as in all other work and the most careful and most experienced mechanic will sometimes find that he has heated his steel to a white or perhaps a "spitting" heat. Steel that is cooled directly after being overheated will, when broken, show coarse, crystalline, or even porous grain, and drawing or tempering has but little effect on its crumbly brittleness. If any attempt is made to use a tool in this condition, its utter uselessness is found apparent.

Some time ago Mr. C. L. Moulton, in The American Blacksmith, gave the result of some experiments he made on some punches and cold chisels, which he purposely overheated and then upset and worked over with a hammer. He stated that he could see no difference between them and those which had not been burned and that he believed any piece that could be hammered could be restored so that the difference could not be detected.

I have had over eighteen years' experience in handling, forging, hardening and machining steel of all kinds and brands and for all kinds of purposes, both personally and as a foreman in some of the largest shops in the country, and I fully agree with him. But I will go a step farther and say that many, not all, tools that cannot be hammered may be restored so as to defy detection of any difference in cutting or staying qualities. Nevertheless, as a foreman. I would "fire" a man who burned more than an occasional piece, for the simple reason that a man isn't supposed to spend half of his time doing over work that should have been right in the first place. Now, mind you, I don't say that it doesn't permanently damage tool steel to some extent to be burned, but I do say that steel that has only been overheated once or twice can in many cases be restored to such an extent that no ordinary test will show the damage.

In some cases overheating would utterly ruin a tool, not so much because of inability to restore the grain of the steel as because the piece would be so changed in shape as to render it useless. Milling cutters, fine punch press dies, and punches of irregular shape and tools of that class would be apt to be spoiled

from warping or having the thin points or edges burned off and there would be no remedy but to make a new tool.

These methods have been given in the order of their efficiency, though there is slight difference in the results. this difference being most apparent on lathe or planer tools doing work that is hard on the cutting edges of the tools. Some prefer to anneal the tools after working them, as in the first method, and before hardening them, but I do not consider this at all necessary if the hammering is properly done. The whole idea is to refine the grain of the steel so that when broken it will have that fine, "velvety" appearance so pleasing to the eve of a steel worker, and not the coarse-grained appearance that makes a man doubt whether it is tool steel or cast iron.

The loss of carbon in overheating is not nearly so much, except in very thin pieces, as we are usually led to believe and really doesn't amount to anything at all unless the high heat is repeated several times, or is continued some minutes. And even then a great deal of decarbonized steel will scale or flake off. In fact, more damage is generally done by using a thin bed of coals and excessive blast, and thus causing loss of steel by scaling, than by overheating. When a thin fire, strong blast, and overheating are all found together, the greatest amount of damage is done, and the result is certainly discouraging. But with a thick bed of coals and a reasonable blast, the damage to overheated tool steel is ordinarily more physical than chemical and should be treated as such. Nevertheless, the burning of tool steel, except as experiments, is an evidence of either carelessness or ignorance and should be discouraged by every possible means. But hand punches, chisels, lathe and planer tools, or any tool that can be worked may be made over, and the grain of the steel restored in at least one of three ways, viz.:

First, by upsetting, hammering, and thoroughly working over not only the burned part but for a little distance back of it, the working being done at a good red heat and kept as nearly so as possible while actually working. Then when thoroughly worked the tool is hardened and drawn as usual.

The second method is good, though I do not consider it quite as reliable as the first, but it can be used on tools that are of such shape that they cannot be hammered, and at the same time ones that do not have to be so accu-

rate that a slight change in size or shape ruins them. When this class of tool is discovered to be "burned" it should be allowed to cool and then be slowly reheated to a low red and allowed to cool very slowly. It may then be hardened and tempered as usual. A good way to do this annealing is to heat up a good-sized piece of scrap iron at the same time and to the same heat as the tool, then place the iron in the bottom of a hollow scooped out in a barrel or box of slacked lime, lay the tool or tools on top of the hot iron and cover all with five or six inches of lime and leave it alone for ten or twelve hours, or more if needs be.

The third way which will give ve y good results on lathe tools, chisels, etc., where no time can be taken to anneal or work over is to let the tool cool

rapidly on the surface only and possibly in spots. The air, driven with great volume from the blast pipe, has not a chance to be converted into mellow heating gas, and striking, cold and raw, on the sensitive surface of the heated metal causes combustion of the latter. There is a display of bright, sizzling sparks which ascend and burst in showers like miniature rockets. The fire having no body to resist the strong air pressure spouts upward like a young, healthy volcano, scattering cinders and slag all over the premises; and so far as welding that particular metal is concerned the "stuff is off."

The Lap Weld.

The type of weld most commonly used, and also the best for all purposes to which it can be applied, is the lap



AN UP-TO-DATE TEXAS SHOP, RUN BY ELECTRICITY

until just as the red leaves the piece when holding it in a dark place. Then plunge it into cold water. This is what is known as water annealing and is often used to anneal pieces needed at once. After water-annealing the tool as above, proceed to harden and draw, and if you do a good job it will take an unusually observant workman to detect the difference in even this quick method. For a great many cases, this last method is all that is needed.

The Smith and His Work-4. ROBERT B. KERR.

Never attempt to heat with an insufficient body of fire, by crowding on the blast. The work will heat

weld. It is absolutely safe, if any weld can merit that term. The surfaces of the scarfs being plane there are no pockets to accumulate slag, and if any should adhere it can be readily knocked off before welding. The scarfs should be formed with the points slightly curving outwards so as to let the main body of the stock weld first. If the center of the job be not properly welded at the first heat, no subsequent heat will ever reach it again; the job may look all right on the outside, but will never be trustworthy.

The Split Weld.

The split or V weld is much used, especially for work that through any cause has to be welded in the fire. The V should be moderately long.

See that the pieces fit smoothly and snugly into each other before placing in the fire. Leave the tongue wider than the body of the job; it will hammer down nicely in welding and leave the job smooth. After scarfs are fitted, clean them thoroughly and sprinkle welding flux on them before placing in the fire. Heat slowly, turning the job in the fire frequently to insure a regular heat. Do not apply the ram until the work comes to a welding heat: then drive up solidly. Be sure that the tongue fits up snugly in the crotch, otherwise, the pieces will draw away in working, leaving the job weak where strength is most desired.

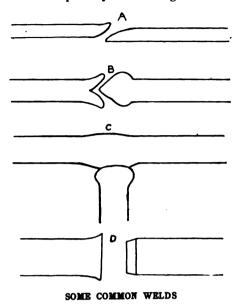
In the days when iron shafting was used it was common practice to weld them together in the fire in this manner by simply butting them together. This was a quick, easy method of welding, and if a good heat is obtained will do for iron, but is no good for mild steel.

The T Weld.

In joining two pieces at right angles to each other, the T or jump weld is commonly used. Upset the straight piece sufficiently to allow for working; iron will waste more than steel. Work up the T scarf or bonnet neatly, leaving plenty of scarf all round; leave the bonnet slightly crowning so that it will unite in the center first. In welding, give the shank of the T a few quick sharp blows with the sledge and work in the scarfs all round with a fuller. Never attempt to make a weld of this kind in a heading or forming tool. A bad job will invariably be the result. If a forming tool has to be used drive the work into it after it is welded

Building Up Stock.

It is sometimes necessary to weld two or more layers together in order to get a piece of stock heavy enough for some job. In doing this, be sure that the surfaces to be welded are clean and free from scale, and sprinkle a small quantity of welding flux be-



tween each layer, before placing in the fire. Heat up slowly. The better way, however, is to take separate heats on each piece. In this way the job will always be solid clear through.

Welding Tool Steel to Iron.

In an operation of this kind, as in facing up an iron or mild steel die or large tool with cast steel, the utmost care must be taken with the fire, for iron and cast steel weld at two different temperatures. Heat the body of the tool to almost a welding point before placing the hard steel in the fire. If the softer piece is of any considerable size, and the hard steel is thin, as frequently is the case, it will not be necessary to bring the latter to exactly a welding heat. The heat from the larger piece will bring it up sufficiently after the pieces are

laid together. In any event it is good practice to leave them alone a moment or two before applying the hammer; then start from the center with quick, sharp blows; working out to the edges on all sides.

Welding Tubes.

The blacksmith is sometimes called upon to weld a boiler flue or other tube. Draw one piece to a short, sharp scarf, flaring slightly outwards. Fit the other, always the short piece, into it neatly. One half inch of lap is ample. Sprinkle the scarfs with welding flux before putting together. Have a clean, short fire ready, lay the flue in it, supporting the end against a block to prevent slipping apart. Heat carefully, and when ready drive together with a few light taps on the end, then with a light hand hammer weld in the scarf all around without removing from the fire. The tube will be thoroughly welded. If necessary it can be smoothed up on a mandrel afterwards.

Welding Rings to Size.

Nearly every smith is a law unto himself on this subject, and many fearful and wonderful calculations are made in the fulfillment thereof. There is perhaps more chalk and profanity used in making the necessary calculations than in any other branch of the business. Here is a simple way.

To the diameter of the required circle add the thickness of the stock to be used in making the ring. Multiply the result by twenty-two and divide the product by seven. This will give the exact length required without any allowance for welding. Always remember that the thicker the stock in proportion to the circle the more it will take up in bending.

In making a weld of any description,



A GENERAL SHOP OF OHIO, RUN BY J. FELLER & SON



ANOTHER OHIO SHOP, OCCUPIED BY J. M. WARNER & SON





BROTHER L. E. PHIFER'S GENERAL SHOP IN NEBRASKA

THE VEHICLE WORKS OF COFFEY BROTHERS, AUSTRALIA

more particularly one on which human life may depend, make absolutely sure that your work is solid before letting it go out. Hammer all welds well. If they are good, the pounding won't hurt them. If not solid they will probably show it, and you want to know it, anyhow. If there is the least suspicion that the job is not solid throughout do not hesitate to cut it apart. A wash heat will make the outside look all right, but will make the inside worse.

A poor weld knowingly washed over and sent out is a lie of the worst type, and where human life and limb depend on its stability, is little short of manslaughter. Blacksmiths, remember this the next time you are tempted to let a doubtful one pass.

Welding Fluxes.

The two prime objects of a flux are to preserve the steel from heat while in the fire, and to prevent scale forming thereon, at the same time forming a coating on it that effectually prevents the noxious gas in the fire from coming in contact therewith.

The basis of all good welding compounds is borax, and in its pure state it is perhaps the best flux known. It should be charred before using, by heating in an iron pot until all frothing ceases and then broken up. A small piece of resin or tallow added while the borax is melting will make it stick together better. The object of charring, is simply to remove the water, and for welding iron or mild steel it seems to do well enough in its natural state.

Remember that the usefulness of a flux ends as soon as the work leaves the fire, so knock it off the scarfs before putting together.

The writer worked for some years in a large plow factory where a great many tons of flux was used each year. The method of preparation may be interesting.

The borax is taken from the casks and run through a grinder which reduces it to a fine powder. The firm has a contract with a nut and bolt factory who supply them with nut tappings, and also all the tappings and drillings made in their own plant are preserved for the same purpose. This stuff is heated in a crucible to remove all grease and then graduated to size with a riddle, to suit the various kinds of work. The borax and tappings are supplied to the men separately; they mix them to suit themselves. There is no virtue in the tappings, other than to roughen up the surface of the scarfs to prevent slipping. It is mainly used on high carbon plow steel; shares, moldboards, landsides, etc., and gives excellent results, besides being most economical.

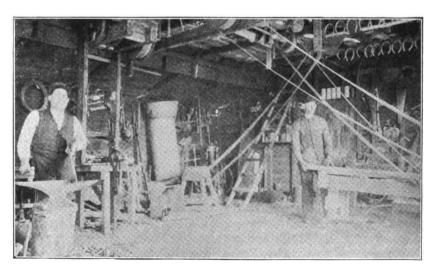
For welding fine cutlery steel, the Sheffield men use a compound composed of; by weight:

Charred Borax, one pound,
Sal-Ammoniac, four ounces,
Carbonate of Iron, three ounces,
Black Oxide of Manganese, two ounces.
This compound, they say, has no
equal for their class of work.

Sand should not be used to weld even mild steel and is utterly unsuitable for tool steel. It is difficult to get it clean and, besides, the heat required to weld steel is not sufficient to thoroughly melt the sand, and even with the utmost care there is always some of it left between the scarfs. It is by no means a good alloy. It is, however, useful in taking a wash heat on a large piece. A little of it sprinkled on the work will flow freely and keep the heat in good shape. It should, however, always be brushed off before finishing, so as not to hammer it into the surface.

While on the subject of fluxes let me warn my readers against investing in so-called "secret" recipes for welding steel, formulas for restoring burnt steel, the secrets of steel working, etc. Any steel that is made to weld can be united by either of the two mentioned in this article.

The best way to treat burnt steel is to throw it in the scrap pile. True, the outer surface of a tool that has been overheated can be carbonized by applying sal-ammoniac or cyanide of potash (pottasium cyanide), but no chemical is

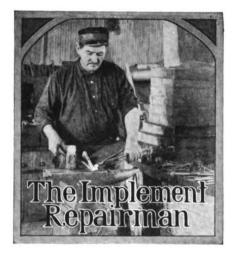


INTERIOR OF BROTHER PHIFER'S SHOP IN NEBRASKA

powerful enough to penetrate the steel far enough to make it of any practical value.

The secret of successful steel working lies in a careful study of the subject, intelligent application, patience and that best of all teachers—experience.

(To be continued.)



Gun and Novelty Repairing-7.

W. G. MUMMA.

Work on Shotgun Barrels.

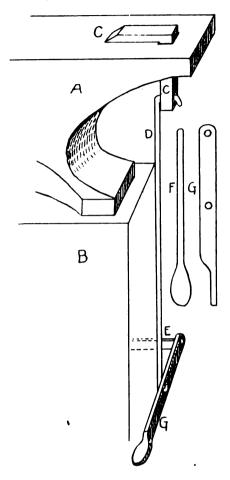
To finish up a barrel after chokeboring use a tool made similar to a Tomlinson cleaner. Use leather instead of gauze and apply plenty of fine emery powder. Turn it in the barrel by using a brace. This will give a high finish inside like factory work. You can bore out and polish any shotgun barrel that has become rusty and dirty with this tool.

Choke-boring tools can be bought ready made, but they are generally most too light and one can make a better tool as above described. Chokeboring improves the shooting qualities of a gun by shooting a closer pattern than the plain cylinder bore.

To fit ribs to barrels, select two barrels for exact size as to length and diameter at both breech and muzzle. shotgun barrels are finished up or made some smaller at the center of their length than at other portions. When the barrels are thus flattened as nearly alike as possible and as straight as can be done with a straight edge lay both barrels together on a bench or level surface and see that the flattened surfaces touch each other true and evenly. See if flattening is parallel with the outside flats (if any are left on). Now place a small square on the same surface on which the barrels are laid, letting the upright arm of the square just touch the outside flat. If the square touches the flat alike from top to bottom the flats are paralleled. But if not, file the flattened surfaces until they are right and coincide with the outside flats.

To obtain the proper amount of divergence of the barrels for accurate shooting proceed as follows: Let the lines of the bore of the barrels converge at the distance of forty yards. This will obtain as good results as any other distance, after the barrels are properly fitted for such a distance. They are now ready for soldering together. It is best to first braze the two ends with a hard solder that is easy to melt. And afterwards to solder the rib on with soft solder, by clamping the barrels tight together and then brazing. This applies for high-grade work. Then proceed to fit the rib and then solder it on. Wherever the rib and the barrels touch, the surface should be tinned. Then put a strip of solder under the rib, applying plenty of acid. Then clamp ribs to barrels in their proper places and soak all the joints with solder by using the torch and the soldering iron. Now clean up the surfaces of all acid and solder. The rib could be brazed on by using a hard solder that is easy to melt, so as to prevent the barrel from becoming very hot. This work is done by the factories, but sometimes such a job

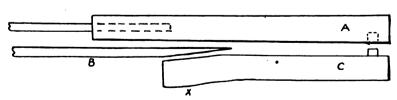
piece of steel A about five inches long and another one C about 3½-inches long, each of ¾-inch half round. Put a pin at one end of C and then clamp the two pieces together and dress up with a file, with the shorter piece having a raised part at X. This is to come



A HANDY ANVIL HELPER

on the dent. Now take a piece of 1-inch wide stock 1-inch thick and about eighteen or twenty inches long and file one end to a long wedge point. When the piece C is placed on the dent drive the wedge B between the two pieces A and C which will force the raised part X against the dent and will raise it up. Drive the wedge lightly and be careful that the dent is raised so as not to make a bulge. The barrel needs to be heated first by the torch before using the tool by putting a handle to piece A eighteen inches long. It can be handled to better advantage in placing it on the dent.

If a barrel should get a very heavy bulge it is best to get a new gun or barrel, but they can be swedged back by placing a mandrel in the barrel that fits tightly. Then heat and use a swedge on outside made to fit barrel, and then hammer the bulge down. This



A SIMPLE TOOL FOR REMOVING DENTS FROM GUN BARRELS

Then select the two sides that are to be joined together and file these two sides flat, more at the breech and less at the muzzle until the smaller diameters in the middle just touch each other without being filed. Nearly all

will have to be done in the small shop.
All shotgun barrels are tested and proved the same as described for rifle barrels.

To take dents out of shotgun barrels use the tool shown in Fig. 3. Take a

must, however, be done very carefully, so as not to greatly weaken the barrel.

(To be continued.)

A Handy Anvil Helper.

J. M. PFEIFFER

I have a little device which is very useful in my shop, as I work alone most of the time. The device is simple, but I can split heels on shoes and do such work better than if my helper would hold the work with the tongs. In explanation of the diagram: A is the anvil, B the anvil block, C the "Gripper," made from stock the size of the hardie hole and projecting about seven inches across anvil and four inches below the face. I used an old axleone-inch stock. The connecting rod D is of 1-inch round stock. The treadle is shown at G, which is a side view, while F is a top view. The treadle is of 1½ by %-inch stock. The piece at E is fastened on the front of the anvil block about two inches from the floor. Burr the end of E to hold the treadle in place, but allow it to work freely. Make hole in C large so as to spring in the hook on rod D easily.

The Apprentice Question—5. DAYTON O. SHAW.

The Board of Education of New York City recently appointed a committee to investigate Trade Schools, with the idea of ascertaining whether they could be established as part of the Public School System of the city. This Committee is now formulating a set of questions to be sent to manufacturers to ascertain what trades might best be developed in these public Trade Schools. Dr. James P. Haney, secretary of the National Society for the Promotion of Industrial Education, was requested to prepare for this Committee a report on vocational and industrial schools such as might be established as part of the city's public school system.

The Massachusetts Commission on Industrial Education found upon investigation that there are some twenty-five thousand children in that state between the ages of fourteen and sixteen years who have left school and who are drifting from one trade to another, vainly seeking "From this it to gain a foothold. might be inferred," says Dr. Haney in his report. "that the most important part of the entire question of tradeteaching dealt with pupils between the ages named. In reality, the question is one which should deal with the pupil before the age of fourteen for, unless the

latter has received some definite vocational interest and bent before he reaches the limits of his compulsory schooling, he leaves the elementary school without inclination, insight or training in any of the things which make for a successful adoption and pursuit of a vocation. While, therefore, it is emphasized that trade-teaching, as such, is not to be thought of before the age of sixteen, preparatory vocational training must be a necessary preliminary to the development of what may be termed the clientelle of the Trade School."

Now, boys, you may criticize these articles on one condition, and that is that you suggest a better remedy. At this point I wish to call your attention to what THE AMERICAN BLACKSMITH is doing to advance the apprentice, the smith and the trade. I for one appreciate their support. Long live THE AMERICAN BLACKSMITH!



The Editor was busy looking over the proofs of the next issue when Jimmie Ganson came in. Jimmie is a smallish chap, bright as a new coin, with an experience of some seven years in general work. He is a born mechanic—seems to know machines and mechanics as thoroughly as a cat knows her own kittens. always said that instead of being born a silver spoon in his mouth he had some kind of machine model hung on his But that has nothing to do with his talk with the Editor, except to let you know that Jimmie is a mechanic up and down from side to side and all around, no matter how you look at him. For the past two years Jimmie has been in business for himself down near Wilson, where he has built up a business such as few men can boast.

But for all of this, Jimmie was troubled. His face showed it and the Editor noticed

"Well, Jimmie, is your best friend dead?" questioned the Editor, as his visitor fell into a chair.

"No, but I'm in trouble—that's why I'm here. I want you to help me."

"Well, Jimmie, let's get at it right end to. Light one of these, get that worried look off your face and then tell me what it's all about," and the Editor handed over the cigars and prepared to listen.

over the cigars and the Editor handed over the cigars and prepared to listen.

"It's just this," began the other after lighting his cigar. "You know I've got about as many men as any shop in this section. I very seldom have trouble with the boys. I've always paid them good wages and they have been a very good crew. But some of them got it into their heads that I can't do without them, and right now it would be suicide to fire them. Men are at a premium. I mean good men, and I've got too much work to chance letting any of them go. What I want is some ideas on paying men. I don't care what other shops pay. I'll willingly pay what my men are worth, but I don't want to be done up."

"Of course it all depends upon what a man is doing," replied the Editor. "If

"Of course it all depends upon what a man is doing." replied the Editor. "If you want to pay him according to his work, you must consider what his work is bringing to you. You want to consider him as an investment. Then find out what dividend he is paying. If he doesn't pay a dividend he's a poor investment and you had better let him go.

"Now, for an illustration, take those big presses out there," and the Editor opened the door of the press room where the big presses hum and whirr and buzz. "Suppose a man were to work for nothing on one of those machines, and while his labor and time cost us nothing yet he wasted half or even a quarter of that machine's time—that man would be expensive compared with a three-dollara-day man who kept the press up to the very limit of its efficiency.

"Now, suppose you hired a green hand at three dollars a week to work under a high-salaried man—if the green hand doesn't get into his job and earn a better salary he'll waste the time of your high-priced man, and he becomes an expense instead of an investment, although you pay him but three dollars a week.

"Another thing: a fifteen or twenty-dollar man can't be given fifteen and twenty-cent work with profit. Nor is it well to reverse the thing. Pay men in accordance with their work, and also give them work according to their pay. You must determine whether a man is a good investment or an expense. What return do you get as a result of the ten or twenty that you invest weekly? What dividend is he paying? That will settle the question. And with an intelligent man it seems to me you could state the case frankly, if necessary to convince him that his demands are unreasonable. I just give you these points to make you think. You can figure out the practical end for yourself. The more you study on the problem of labor wage the more you'll find in it to study. It seems to be a ——."

But, Rogers came in at this point with a casting under his arm. "Say. Mr. Editor," said the new comer, "What will I do to fix up this casting? It has a number of blow holes."

"Why, a mixture made of sulphur, fineiron borings and graphite will work fine," and the Editor turned to the bookcase and took down a small volume. "Here it is: Melt some sulphur in an iron ladle and stir into it enough fine-iron borings to thicken, yet not to make the mixture impossible to be poured easily. Now add a small amount of graphite, pour into the holes while hot and then smooth down with a file."

"Thank you, Mr. Editor. That seems to be simple enough," and Rogers went out.



The Builders.

S. E. KISER.

(In Technical World.)

We trust a hundred times a day to bolts and bars and chains

As fearlessly we hurry forth in eager search of gains;

We go by anxious thousands to unfinished tasks or new.

Where each danger might be trebled by a faulty nut or screw;

So let their work be flawless who design and forge and build,

Lest faith be shamefully destroyed and blood be dearly spilled.

We are but soldiers, going where our duties bid us go,

We may not pause to choose the ways, but trusting, high and low,

That gleaming rails and whirring wheels and flashing cranks are free

From faults that careless hands might leave or slovens fail to see,

We travel forth to do our best, each in his ordered way,

With faith that it were well to guard and shameful to betray.

They that design and they that forge, they that direct and build,

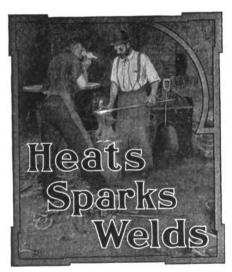
They that perform the pregnant tasks allotted to the skilled,

They have us in their keeping, 'tis to them we owe at night

Our freedom from disaster and the strength that brings delight.

So let their work be fairly done, that we, plunged in the stress,

May keep the faith 'twere shameful to betray through carelessness!



Business sense makes business dollars.

The leather apron doesn't make the smith.

Have the longer days brought a proportionate increase in work?

We're here to help you. If you have shop troubles tell us about them.

Perhaps both need it.—A bit of paint will work wonders with shop and sign.

The time to organize is now—before conditions get so bad they must improve.

Strike a happy medium. 'Tis as bad to underestimate as to overestimate one's work.

Are you sorry you ever learned black-smithing? Surely there is nothing the matter with the trade.

A postal addressed to the Secretary will bring you his easy plans by return mail. Why not write him right now?

Aim to make the buyer buy again, by putting best quality into every job from the forging of a bolt to the building of a wagon.

How much is a fifty-dollar kit of tools worth in the hands of a man with but thirteen cents' worth of knowledge and experience?

Extra profit opportunities innumerable are presented in our advertising pages. Pick a side-line now. Ask the advertisers for a side-line proposition.

Do you measure age by deeds or years? Some old in years are infants in deeds. How much better a ripe old age in deeds, whether young or old in years.

The manufacturers of grinding wheels make a study of grinding problems. If you are having grinding trouble tell the maker of your grinding wheels.

Boost your business to where you want it, where it should be. Careful, powerful, persistent, intelligent pushing will place your business to where you want it.

Because father and grandfather did is no reason why you should stick to old, back-breaking, muscle-tiring methods. Modern smiths use modern methods.

Poor care wears out more tools than actual use. Economy doesn't mean using old tools long past their usefulness, but care of tools both in use and after use.

Help us to make the paper better. Our aim is to constantly improve "Our Journal." We want suggestions, criticisms, recommendations. Let us have your letter today.

Increase profits by cutting expenses, stopping waste and buying close. The difference between the money you pay out and the money you take in is net profit.

Cut prices mean cut profits. You can't cut cost by shaving selling price. Your customer is the only person who profits. Are you in business for your customer's profit?

A special file should you have for your trade catalogues. They are just crammed full of trade information. Some smiths don't even save the catalogues they receive.

Get together with the smiths in your county. An association started now will be strong and flourishing by fall and you can reap full benefit of the fall trade rush. Write the Secretary today.

John Hogan says: "My father shod horses before he came to this country and my grandfather before him. I couldn't do anything else if I were to make a hundred times as much money."

Are you one of the half-hundred smiths who have furnished items and ideas for this issue? How long will we need to wait for something from you? If other smiths can help you, surely you can help others.

Few men know how important it is to keep the leaks stopped up. What! no

leaks? How about bad accounts, waste material and profitless jobs. If allowed to go on they will wreck the ship of business.

Perhaps you are the best smith in town, with the best equipment and doing the best business. but how are people to know unless you tell them. A few doses of advertising tonic will help both you and your business.

"Funny thing, I can't raise prices." Said Tom. "When I want five or ten cents more for shoeing, everybody kicks and says they'll go somewhere else. Brown down the street gets half again as much as me." Friend Tardy doesn't seem to think that quality has a lot to do with price.

"One place for everything, is my motto' said Tom Tardy. "Then I know just where to find what I want." And he turned to a big box of rubbish and odds and ends to look for a socket wrench, which he discovered, after a full hour's search, imbedded in the dirt at the bottom of the box.

If it's necessary to do a credit business extend credit in a business-like manner. Determine whether or not your would-be customer is really entitled to credit. And if his record shows that he is slow pay or a downright beat, don't be afraid to say no. Better by far to sit idle all day than to work like a horse for nothing.

A grinding wheel will sometimes appear softer toward the center. This is usually accounted for by the fact that the rate of speed is not maintained as the wheel diameter is reduced. It is also true that while the wheel may be uniform throughout, yet the smaller line of contact due to the smaller diameter will cause the wheel to appear softer. To increase the speed of a wheel gives the effect of a harder wheel, while decreasing the speed gives the effect of a softer wheel. The wheel should be run at the same periphery rate as it wears down. Speed up the spindle as the diameter of the wheel is decreased.

"Success don't consist in never makin' blunders, but in never makin' the same one twict" says Josh Billings. And he who practices this will certainly succeed. It is also true that success only comes to him who tries. You can never tell what you can do until you try. The man who doesn't know whether he can do a piece of work or not, but is willing to try, has the right spirit. Lots of things that couldn't be done have been done. A few years ago a horseless carriage couldn't be built, but now we are lucky if one of the things doesn't run over us. Success doesn't come by accident. It's a fight, it's a contest of wits. You must cheer up and hustle. Business is a good game, so play it to win. If it required no work, energy, nerve or brain there would be no glory in achievement. Any fish can float down stream, but it takes a live one to swim up. Be a live one, buckle down to business and if you get knocked out of one plan remember that it's worry, not trouble, that cripples a man, and get another plan right quick, before your spirits have a chance to fall. Then make 1909 The Successful Year of your life and business." Says Brother W. T. Dickey, of Tennessee.



American Association of Blacksmiths and Horseshoers.

"I feel that the only protection the smith has is an association. Without it he is but a humble subject of the public."

"I have often thought how very badly we need the protection of an association in this county. We hardly get a living price for our work."

get a living price for our work."

"I have already called upon the smiths in this vicinity and all seem to feel the need of protection. They are all willing to form an association."

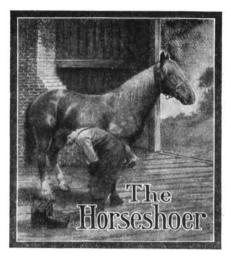
The foregoing are just a few extracts from letters recently received and requesting plans for the formation of blacksmiths' associations. Do these lines express your ideas? Do you feel the same about your trade? Don't you think that you deserve protection? Then why do you hesitate to request my easy plans? Lots of smiths are following these easy plans to form branch associations, why not you? Let me have a postal from you today.

You deserve protection. You deserve better prices. You deserve to have a better understanding with your brother craftsmen on all problems touching upon the craft. You deserve better representation in the legislature. You owe it to yourself, your family, your trade. How can you get all this? By sitting idly in the shop and picturing better craft conditions in the smoke from your pipe? By talking it over with the boys at the corner store? ACTION is needed. Nothing else will do. You can dream from now to the end of time-you can wish a thousand wishes, but action is the only remedy. Send for my easy plans. Don't let another day go by without my plans.

This is the best time of the year to start an association movement. The roads are good—smiths can easily attend meetings. An organization started now will reap full benefit during the fall trade rush. 'Twill take but a minute to address a postal, P. O. Box 974, Buffalo, N.Y. It will cost but a penny, and when so much good will result why not take the little time necessary.

Ask your brother smiths about the matter first if you want to, but get things started now. Snow will fly again in four or five months and then an advance of five or ten cents on a shoe will look mighty good to you. Let me hear from you by next mail. Don't put it off—let me hear from you now before you put this paper aside and forget all about it. It will take you but a fraction of a minute to write now. Write right away. A penny postal and a pencil will do the trick.

THE SECRETARY.



A Word About the Shoe and Its Fitting.

E. H. MALOON.

According to history and tradition the original horse was a very small and insignificant animal, and it is largely through man that we have the horse of today. In this horse we have a large animal, beautiful to look at, and in him we have a friend that is willing to do a large amount of labor for a very small recompense, and it is beyond my powers of reasoning to know why we should abuse him. While man has been able to develop the horse into the beautiful creature we have today, he has not been able to make him grow feet that will renew themselves as fast as they are worn away in the labor we ask him to do, hence the necessity of protection.

In our knowledge of today the best protection is a rim of iron fastened to the bottom of the foot. And right here the skill of the shoer comes, in knowing how much protection the horse needs and in fastening that protection on in such a manner as not to interfere with his movements. That is the whole science of horseshoeing and is also one of the greatest abuses that the horse has to endure. It seems to me if owners and shoers would stop to think and get acquainted with the horse they would soon know that there is a large per cent of the horses that do not need to be shod at all. Another class that only need very small protection. Again, we have the heavy draft horse, with his flat, weak foot that needs lots of protection and of the very best kind. Instead of that kind we stand him up on three calks and an open shoe. In a short time he goes wrong and is sold for what he will bring and the owner suffers a large money loss. Now, why not take the green Western horse and shoe him with a flat shoe and frog pressure.

Not long ago I heard one of the best veterinaries in the city of Boston discuss this very matter. He said that the power that enables a horse's foot to stay where he puts it is friction (we all know this). We need not follow him further, but let our own reason work. If it is friction that holds the foot to the ground, ask yourself which has the most friction, three calks or the whole surface of the foot? Follow this along as far as you like and but one fact remains.

Today I am shoeing large, heavy draft horses with a flat shoe, and they give the owner perfect satisfaction. Now the time is coming when it will be icy and the horse must have sharp calks. Then use the bar shoes and give the frog pressure. We cannot have a good horse and take the foot off the ground, with no support, for any length of time. You can prove this by visiting any large stable of work horses and seeing the horses that go wrong, causing the owner to lose more money than in all the other troubles that the horse has to contend with. Frog pressure is absolutely necessary to a healthy foot. You cannot expect broad, open heels if the foot is placed on stilts-high calks. Frog pressure means health.

(To be continued.)

Fitting the Shoe and Shoeing the Horse.

BILL HILL.

Just a few words upon a subject that, if thoroughly covered, would embrace volumes, and being neither Irish nor Scotch, but good old American born, I will throw no stones, for glass is pretty well up in the market today.

In the first place, if I lived in 'Frisco I would not try to tell my brother in New York how a horse should be shod. Climatic conditions have everything to do with the way in which I shall shoe a horse. Take a young horse and we will shoe him. He is just off the pasture and has a round foot. Notice the uniform thickness of the wall all around. After a few shoeings under Brother McLain we have a foot not nearly as wide as the original. Why? Simply because we have neglected to top dress the toe and keep the wall the same uniform thickness that was apparent in that nice young foot. The toe has thickened and the quarters have not. Nip off a piece of the foot all around and let it dry and watch it curl up. Stand that horse on a plank floor and drive him on the dry, hard roads and watch the feet contract. Nature, you say, gives the toe a thick wall to carry the shoe and stand constant pounding on the road, but we have also taken this horse from nature and given him either to a neglectful owner or one without much of the knowledge as to what is beneficial to the horse. If this horse was on the range, he would hunt his own foot remedies in the low lands when needed. But he can't now. He has to stand for whatever the horseshoer is capable of giving.

Inflammation in the Horse's Feet.

A. F. LIBBY.

Preceding any inflammatory condition we have congestion of the part, that is, the capillaries are dilated; they lack power. As the blood keeps feeding these small capillaries and is partly checked we have increased force in the larger vessels, which causes the smaller ones to throb. In the normal foot the lymphatic system carries away from the foot not only the waste tissue but any over-deposit to the lymphatic glands. These glands are called by some "repair shops."

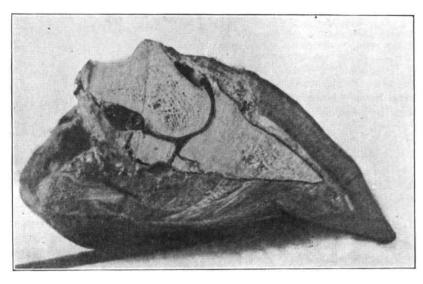
In quittor, if from any cause these tubes become inflamed, they become enlarged, and as they run through the laminæ and cushion they sometimes affect the lateral cartilage and even the pedal bone. A deep-seated quittor is nearly incurable. In navicular disease we find inflammation in the membrane of the capular ligament and if the disease is advanced we find the capsule beneath the navicular bone to contain a thick ielly, instead of the senovial fluid. I have seen many cases of so-called navicular trouble before the bones became diseased. It can be helped in large part by shortening the ground bearing of the foot and opening the tissues at the fetlock and those below the knees. I use glycerine to soften the tissues if they are hard and dry. Don't cut them off, but use something to soften them. We have a veterinary among us who makes a success of removing the navicular bone in chronic cases in some family pets. but I have never seen the operation performed.

Inflammation affects the lateral cartilages, causing sidebones. In lighthorses they are usually found on the inside of the foot and are caused from uneven ground bearing. In heavy breeds they are found on both sides of the foot and are caused from settling of the pedal bone. In congestion of the blood in the quarters of a foot the laminæ becomes enlarged as it leaves the sensitive part of the foot, the horn retains

the color and as this shows in the bottom of the foot we say the horse has a corn.

In the healthy foot the pedal bone is thickest at that point to which the tendon is attached, the rest of the bone is porous and filled with blood. In cases of ostitis we have a thickening and the foot. This can be done by rasping a little at the heel. In fitting a shoe I always see that the shoe is beveled just a little all around and especially at the quarters.

Now, when the shoe is put on, it should fit evenly all around the wall.



THE PEDAL BONE, SHOWING CONDITION OF NEARLY SOLID OSTITIS

condensing of the bone. I have in my collection specimens of this kind in which the pedal bone is nearly solid, there being very little circulation through it. Some have called this water founder. I know of no cure. In all the above cases we should have as short a ground bearing to the foot as practicable. If we can restore the circulation in the foot the inflammation will disappear.

That Ideal Bearing.

HENRY H. FAILING, JR.

In the April number I read Mr. G. F. Stevens' article. He refers to Fig. 1 as "an ideal bearing." I wish to say that I disagree with Mr. Stevens' method of setting a shoe. A shoe set in such a manner would in my estimation give a horse corns in a very short time. In the first place, a shoe should set on the wall and not on the sole of the foot, as in the illustration. The bearing is the same on the inside rim of the shoe as on the outside, and consequently there is as much weight on the sole as on the wall, which is entirely wrong.

My idea of fitting a shoe is to have the shoe as large as the foot, so there will be little or nothing to take off the sides when finished. Then level the foot so the shoe fits tight all the way around, except from the last nail back to the heel, where the bearing should be a little lighter than the remainder of with very little space between the shoe and the sole. In this way there is no pressure on the quarter, where the corns usually occur. Shoeing is a necessary evil and the best that can be done is only a disadvantage to the horse.

Between a horse's foot in its natural state and one that has been shod for years there is a great difference. In a healthy condition the hoof is fine and smooth with no seams and is very tough; the frog is alive and of equal size on both quarters and the heels are wide. The foot has the appearance of being healthy, while the shod foot is entirely different. The hoof is dry and brittle with many seams. The frog is dry and hard and very small. Sometimes it has nearly disappeared. The heels are narrow and contracted.

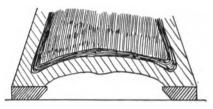
Of all the shoes I have ever used I. think the bar shoe is the best shoe for the foot, and comes nearer to keeping the foot in its natural shape and condition than any other. For quarter cracks and contracted feet I have never found anything to equal it. The weight and bearing is distributed more evenly over the foot, and the frog, which is the life of the hoof, is brought into use. The shoe pounding against the frog keeps the heel spread and the whole foot in a much more natural condition. I think many smiths make a mistake in cutting the heels too low. By cutting the heels low the cords in the back of the legs often become strained and this is many

times the cause of lameness. Another thing which should never be allowed in any shop is cutting out the bars in the quarters. The bar is the strength of the foot and the brace that holds the foot in shape. The bar is to the foot what the rafters are to the roof of a building. When the rafters are cut off the roof comes in and when the bar is cut out the foot comes in. Many a foot is ruined in this way and it is one of the principal causes for contracted feet.

Shoeing a Horse with Ringbone.

z. D. ROBISON.

First of all, we must remember that when a horse has ringbone that the coffin joint is stiff and to shoe him correctly we must try to replace that joint as nearly as we can. In order to do



MR. STEVENS' IDEAL BEARING

this I pare the foot a little lower on heel and toe. Then I fit a shoe, rocker fashion to fit the foot. Make long, low calks thinned down slightly at the heel and roll the toe a little. This allows the horse to step on his heel first (which a ringboned horse does), then roll forward, making it easier to step than if he was shod so as to make a strain on the joint. With this kind of a shoe I have had very good success. If any brother craftsman can give any better way of shoeing for ringbone I would be glad to know it through "Our Journal." I would also like to know the best way to shoe a horse that strikes his front legs from knee to ankle. I shod one of this kind last Friday, the first in ten years' practice. I used a regular front shoe, drawn to make light on inside, and turned a long, heavy calk on the outside. Then I took a 1 by ½ toe bar and welded a heavy block on the outside of the calk. He traveled out well, but do not yet know results.

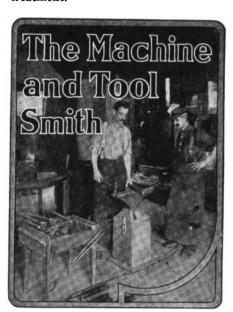
To Know or Not To Know Antaomy.

A. F. LIBBY.

Is it of benefit to the horseshoer to understand the anatomy of the horse's foot? That is a question which is often asked and one which has two sides. In places where the work is nearly all done on contract, where the horses are "ironed," instead of being properly shod and where the owners do not appreciate extra work until the horse becomes lame, it would not pay.

But for the ease and comfort of the horse, if the shoer is a practical man, it is of benefit that he understand the different parts of the foot and what shoe to apply when the foot becomes diseased. If he does not understand the elongation and contraction of the laminæ the use of the lateral cartilages and the preparation of the normal foot, how can he treat troubles in these parts by shoeing?

A few years ago I went to a place to balance a horse; after I had shod the horse the owner took him out to try him. In a short time he came back to the shop and called me out. He was all smiles. He said "You made a good guess on this horse. He is all right." I looked at him a moment and then replied "There was no guesswork on your horse, sir." Of the man who does not believe in the education of the horseshoer I would like to ask one question. If he were sick and in need of help would he send for some man who knew nothing of the physiology of the body, or would he send for the best doctor he could find? The same applies to the shoeing of horses. A horse's foot will stand only so much bad treatment.



A Practical Method of Forging Crank Axles.

L. VAN DORIN.

Take a piece of square stock, long enough for the spindle and the same size as the axle, heat one end and cut across as in Fig. 3. Then cut this chip off at E and forge the end to shape, as in Fig. 4. Now take a piece long enough to make the drop in the axle, as at O, Fig. 1. Take flying heats and set together, as at Fig. 2. The weld can be made and finished at one heat and with a seven-eighths or one-inch fuller a nice fillet can be formed on the inside corner. From the foregoing instructions the spindle must be turned after the weld at corner A is made. If welding onto a finished spindle, as is sometimes done, the lip for forming fillet must be formed on the other piece.

All heavy trucks on the Pacific Coast have cranked axles behind and I have seen them in San Francisco with axles as large as five inches square.

Brother Cran tells three different ways of forming crank axles in the March number, but I think he will find the above way best.

Treating High-Speed Steels.

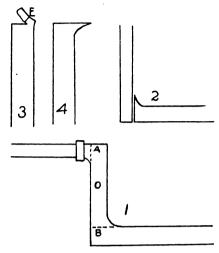
W. J. K.

Of course, there is a right way and a wrong way to treat high-speed steel, both in forging and hardening. There are a number of different makes in use. but I find there is no difference. In handling it they will all give good results under the same treatment. I have experimented considerably with it and I find we can get the best results from a tool put through this treatment: First. heat steel slowly in a clean fire and be sure to have a good bottom of clean coke, three or four inches deep. Always keep your fire filled to prevent the blast from striking the tool and never attempt to forge while your steel is above a yellow heat nor below a deep red. Be sure to do as much hammering on one side of the steel as on the other when possible, and as little edging as possible. If your stock spreads too much it is better to cut a little off than to ruin the tool by edging and by so doing open the grain. Never put the hammer on it if the heat gets below a dark red. Some steels will stand hammering at a higher heat than others, but it is best to gauge yourself by the yellow heat on all kinds. at least all the brands I have had the privilege of using, and I have handled a number of them.

When the tool is finished give it an even dark red. Lay it in a dry place out of the draught to cool. This heating will take all the forge stains out of the steel and assure you of a better tool. If possible, rough-grind the tool before hardening. I would say here that an emery wheel is a very handy

thing to have in a smith shop. We had one installed about a year ago and it has been a wonderful help to me.

To harden, heat slowly and when the working part of the tool is at a lemon



FORGING CRANK AXLES

color cover it with borax. Then put back into the fire and bring your heat up to a white. The borax will protect your steel and will enable you to get a higher heat. Leave it on the fire a minute or two to let it soak. Then brush off and plunge in a bath of four parts raw linseed oil and one part carbon oil. Fish or cottonseed oil is good, but if you use either of the last-named do not use the carbon oil in it; let it remain in the oil until cold. When taken from the oil you will have a tool as hard as glass and as tough as a whalebone—that is, if your steel is of good quality when you begin. Novo steel is considered A No. 1, but I think there are other brands equally as good.

We also have a process whereby we harden high-speed tools, such as reamers, milling cutters, taps, counterbores and such tools as are machined to size. I will explain that at another time.

A Crane for Handling Heavy Work.

W. H. GUNN.

The accompanying engraving shows a crane that we have in our shop. It is a great labor-saver and will swing a halfton weight anywhere about the shop. The materials for this labor-saver cost me just \$4.15, and I put it up complete in two days. I can handle three-inch axles or four-inch shafts with ease with the crane. In short, I regard this device as my best friend and I would not part with it for ten times its value if I couldn't get another.

The engraving is self-explanatory,

though a few words may assist the reader in constructing one. The upright pole or beam A is of four by fiveinch oak stock and should be as high as the shop will allow. It may be ten or twelve feet, if possible. The arm B is of three-quarters by three-inch tire steel, with a round edge and six or seven feet long after bending, and six feet six inches from the floor. This piece is twisted at X, so as to bring the flat face on the beam. The brace-rod C is of 7-inch round stock, threaded at one end for a nut and a clevis turned on the other end for attaching to end of the arm B. The brace D is reinforced with 7-inch rods to the wall or ceiling. The pulley-wheel may be an old one or turned especially for this crane. The strap hung from it should be of good, solid stock. A 3-inch turnbuckle is used to connect the two hooks, as shown, while from the lower hook is hung a swivel eye pulley, with a groove for a chain. The chain should be fitted with a hook for holding different work. The main beam brace is a 3-inch rod fastened and fitted as shown, with an eight-inch

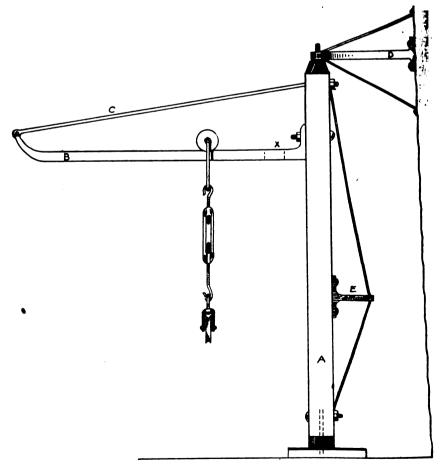
driven on and a pin forced in. The bottom of the beam is let into a wooden block, with an iron socket to take the wear. The upper end of the beam is steadied, as shown, by the brace D, which has an eye on one end to receive the top pin of the beam.

How to Weld Axles or Heavy Iron Easily.

W. H. GUNN.

The two engravings show a method of welding which will make hard work casy and result in a strong weld. It makes no difference whether the iron is round or square. The results are the same.

The V weld is by common consent the strongest known to the craft. But smiths generally upset their metal too much in making these welds. Very little upsetting is required. Just cut out the male and female scarfs to fit, place the parts over the fire and cover over with coke. Then put a little wet coal on that and turn on the blast to suit. Be careful to have the two pieces

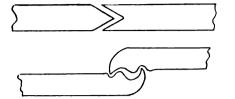


AN BASILY MADE CRANE FOR HANDLING HEAVY WORK

standard in the center at E. The ends of the main beam or mast, as it is called in a large crane, are cut down, a band on something that will not let one piece fall below the other. Have the V straight up and down. Make a small



hole in the front and back of the fire to see when the heat is sufficient to fuse. Now drive up lightly on one end, holding the other. When the parts are hot



FOR WELDING AXLES AND HEAVY STOCK

enough the iron may be turned if necessary, but keep the fire intact. Do not pick it if it is possible to avoid it. When the heat becomes good and soft drive up and the work on the anvil is a small job. I welded a three-inch shaft the

other day with one heat and two twelvebe welded. Throw on a little sand on the top of the metal, keeping the scarfs down and clean. I never use borax on ordinary light steel or iron, but use it on springs, but no sand.

pound sledges in one hour and five minutes from the time I started. The "Lock" scarf is my own device and works admirably on steel axles, because they do not slip. The simplest method I know of is to make it with a fuller and when the ends are hot fit them together with a blow and almost any kind of a heat will stick or fuse, as the scarfed ends cannot slip. Smiths are in the habit of using a great deal of sand or borax. A very small quantity will do and this should not get on the parts to



The International Auto Buggy.

The International auto buggy is of the high-wheeled type and is built for practical as well as pleasure purposes. The vehicle is equipped with a twocylinder opposed engine, with a fiveinch stroke and a five-inch bore. It has a wheel-base of 84 inches, while the wheels are 40 and 44 inches high and equipped with 13-inch solid rubber sidewire tires.

Fig. 1 shows the International auto buggy with two seats and with the top folded. The drive, as may be seen, is by a chain to a countershaft and from countershaft to rear wheels.

A front view of the engine is shown in Fig. 2. This shows how the valves are operated and also how easily the valves may be removed for regrinding. In Fig. 3 is shown a top view of the motor. Here is also shown the mechanical oiler, with tubes extending to the difficult oiling places. The engine is air-cooled by the fans, which are operated by means of a belt run by the fly wheel.

The control of this car is very simple.

The steering is done by means of the regulation steering wheel, while both the throttle and the spark control are placed on the steering column. The clutch and speed-levers are on the right of the driver's seat, while a foot-lever controls the brake. The engine can be conveniently reached by simply removing the front seat cushion. The fuel tank is located under the footboard for the back seat. Here, also, is the

tank for the lubricating oil. The carburetor and chain adjustments can be easily made from the outside of the car.

Adjusting, Repairing and Caring for an Automobile-8.

The Commutator.

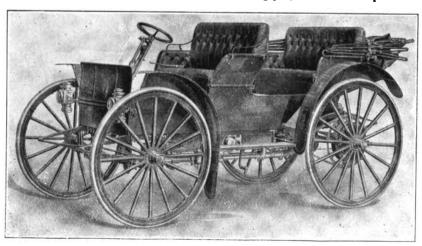
If it becomes necessary to remove the commutator to replace it with another the simplest way is to disconnect spring clips and loosen the bolts which hold the engine and transmission frame together, slipping transmission back an inch, or sufficiently to allow of taking the commutator off the shaft.

As all parts of commutator subject to wear, viz, fiber, contact points. brush, etc., can be removed from body and new parts substituted, it should not be necessary to take off commutator body at all.

An occasional inspection should be made to see that the commutator wires have not dropped down so as to come in contact with the moving parts of the transmission-high speed clutch spider -this will result in wearing the insulation off the wires, causing an intermittent miss-fire, which is very difficult to locate, as it may occur only when its spark-advance lever is in a certain position. The wires should be loose enough to permit the commutator to turn freely without unduly bending the wires at the terminals and yet not sufficiently loose to get in the way of moving

See also that the wires do not come in contact with the exhaust pipe, so the insulation will be burned off and an irregular "short" developed.

To disconnect the commutator, remove the brass cap; unscrew lock-nut: withdraw the steel cap which is held in place by the lock nut: this exposes the retaining pin, drive out the pin and the



THE INTERNATIONAL AUTO BUGGY, WITH TOP FOLDED

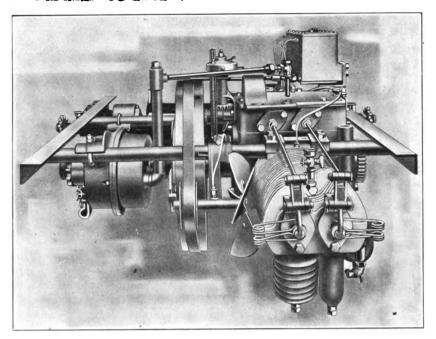


FIG. 2.—A FRONT VIEW OF THE INTERNATIONAL AUTO ENGINE

commutator may be removed from the camshaft. To replace, reverse the operation, being careful to get each part in its proper place. For information as to proper setting and wiring of commutator see diagram, Fig. 1.

Sand and dirt, unless frequently washed away, will accumulate on the outside of the commutator, held there by the grease. This is bound to cause more or less trouble, and of the kind that is difficult to locate. Flush the outside of the commutator with gasoline once every week.

Coils and Batteries.

The most delicate part of an automobile is the coil; and, yet, with proper care it should outlast the life of the car. Notwithstanding there are only one or two troubles which may occur in the coil which can be corrected by an ordinary driver or electrician, the average person has a hobby for monkeying with the coil, and a long and varied experience has taught that about ninety-nine per cent of the coil troubles have risen through this inclination of the average user to go to the coil first and to some more likely place afterwards.

Too much battery current will sometimes "break down" the condenser of a coil and burn off the platinum points. Aside from this, ordinarily, all the coil troubles are due to inexperienced tampering. Not knowing what is inside and having a curiosity to know, or in a vain hope that they may be able to discover something the average user will disconnect the vibrator supports and every other movable part on the coil. Trouble is certain to follow, and

the only way it can be corrected is to send the coil to the maker.

A broken-down condenser may be due to imperfect insulation, or the insulation may be burned out by an overstrong current. In either case you can do nothing with it but send it to the maker for inspection and repair. Once you are convinced the condenser has broken down, the less you monkey with coils as compared with others. It may be set down as a maxim that economy of current can only be secured by the sacrifice of other more desirable qualities.

The question resolves itself into the following simple terms: If you want a good spark in the cylinder and certain ignition under varying atmospheric and other conditions you must put the necessary current through the coil. You cannot get something for nothing. A coil having more winding than another will offer more resistance to the battery current, use less and deliver less to the cylinders. Technically, "E. M. F.= C.-R."-Electric Motive Force equals Current less Resistance. The less resistance in the coil, the more current through the plugs. When it is considered that the "economy" of some coils over others-each adjusted with equal care—will amount to perhaps one dollar a year, it will be seen that real economy consists in getting a spark and saving time in needless roadside adjustments of carburetor and other parts. which are not at fault at all.

Current consumption may be regulated by adjustment of the trembler. For ordinary usage this should be adjusted loosely so the sound will be a dull buzz, instead of a high note. Splitdorf coils, such as are used on Ford runabouts, should be adjusted so as to draw one

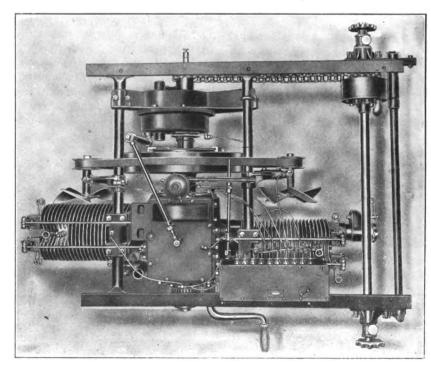


FIG. 3-A TOP VIEW OF THE INTERNATIONAL AUTO ENGINE

it the better, as you may more than double the expense.

There are many fallacies about the "economy of battery current" in some

half to three fourths amperes. Heinze coils, three tenths to five tenths amperes. In the case of racing cars, adjust the coils to draw three to three and one

half amperes. With that adjustment it delivers a very fat, hot spark, but, of course, eats up the batteries very rapidly. Inasmuch as speed and certainty are the only requisites, battery current does not count under racing conditions.

Every repairer should have an ampere meter and test the adjustment of a coil, instead of doing it by guesswork.

To adjust coil, set vibrators as loose as possible by turning the adjustment screw until the contact points almost touch. Turn engine over to position where the vibrator will buzz; turn adjusting screw to the left until vibrator will emit an even, low buzzing sound without any blurring. A high note indicates too tight adjustment, and, while this will give a hotter spark and more certain ignition, it will consume an excessive amount of battery current.

To ascertain which, if any, of the four plugs are fouled with oil, short circuited with carbon, or inoperative from some other cause, open the throttle two or three notches to speed up the motor; now hold your two fingers on two outside vibrators so that they cannot buzz. The evenness of the exhaust will show that the other two are working correctly and that the trouble is not there; or, procontra, an uneven exhaust will indicate that it is between the two that are free. If the two cylinders fire evenly change the fingers to the two inside vibrators and again listen to the exhaust. Having ascertained in which pair the trouble is, hold down three fingers at a time until you find the one on which the motor does not fire. This will indicate in which plug the trouble is. Cylinder No. 1 is front cylinder, and they number in rotation 1-2-3-4. No. 1 coil unit is the one next steering post and they number 2-3-4 to the left.

Before deciding that coil is the cause of the trouble inspect every other possivibrator, with no spark at the plug. A short circuit in a secondary wire will produce the same effect, so be sure it is not a short circuit before blaming it on the coil. A good way to test is to remove the wire from the cylinder in which the trouble occurs and connect a new wire from coil to plug, being sure there is no chance for a short circuit in the latter. Once certain that the trouble is in the coil and that it cannot be remedied

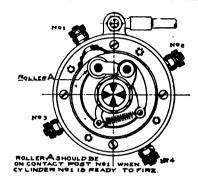


FIG. 1—DIAGRAM SHOWING METHOD OF SETTING COMMUTATOR

by a simple adjustment of the vibrator, a better plan is to send coil to the maker.

An unusual case of trouble which looked like a broken-down coil occurred recently. After driving through a heavy rain and through water puddles several inches deep, enough water had been thrown up on the bottom of the coil to thoroughly saturate the wood, inside as well as out. The current from the secondary terminal followed the water back to the dash support and, of course, grounded.

Never meddle with the coil or its parts, except to make an inspection to see that all nuts are tight and everything in place, so that no mysterious short circuits will occur from this cause. In looking for a short circuit it should be remembered that the secondary current

outside of the insulation of the wires and will finally form a short circuit that will cause a lot of trouble and be difficult to locate. One of the chief causes of excessive battery consumption is the presence of water or oil on the primary wires. It is a good plan to renew all wiring every three or four months; the small expense of doing this will well reward the owner in immunity from ignition troubles.

Excessive battery current or long usage will cause the platinum points to pit. As they do not wear away evenly this causes them to stick occasionally or to deliver a "drizzling" spark. The remedy is to file the surface off carefully using a piece of fine emery cloth wrapped around a flat file, knife blade or other suitable article. Be sure to file the surface flat so as to give a good contact. If it is burned entirely away, replace it with a new one.

One symptom of a "leak" in the condenser is a very "fat," bluish spark at the vibrator points. To make sure that this is the cause of the trouble put a spark gap of about one thirty-second of an inch between the secondary wire and the plug. If the condenser leaks, the spark will be irregular at the gap.

(To be continued.)

Forging Well-Drilling Jars. L. R. SWARTZ.

Brother Dearness, of Queensland, Australia, seems to think that I did not understand his original query. I understood him well enough, but having experimented with jars made according to his proposed plan about twenty years ago, I did not consider that jars made in that way would render the service that jars made the way I described in my preceding article would give. There are

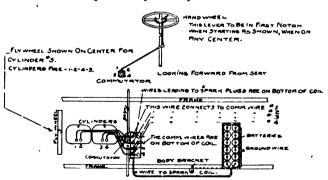


DIAGRAM OF WIRING FOR HEINZE COIL

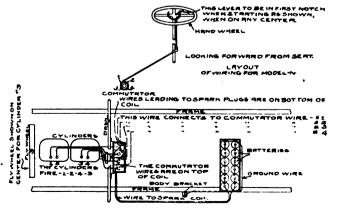


DIAGRAM OF WIRING FOR SPLITDORF COIL

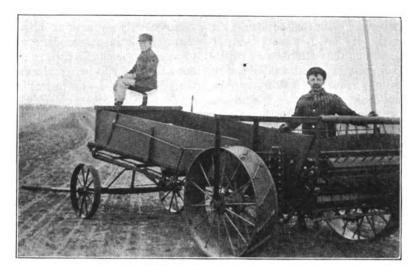
ble source of trouble. In ninety-nine cases out of one hundred you will locate it elsewhere. The first symptom of a broken-down coil is a buzzing of the

is a static, or alternating current and will "creep" on any liquid—water, or oil mixed with dirt. The current creeping on the oil will form carbon on the several ways of making jars and it depends altogether on one's facilities for doing the work as to which way may be considered most expedient.



Twenty years ago I expected to make a great improvement in the method of making drilling jars by working the heads and reins of the links out of the solid, thus avoiding all welds in the heads. I proceeded by taking flat stock, 1½ by 4½ inches, punched a 11-inch hole and cut the stock out as indicated at C. I then upset the tongues and swaged out the guide on the tongues, as shown at A, B, and D. At E is shown a cross section or end view of the tongue and guides, looking at the point of the tongue. I put these jars to work on a string of pole tools, the stem and bit weighing about 425 pounds, drilling a 5-inch hole. They lasted about half as long as jars made in the ordinary way. Almost as soon as they began to show any wear it became evident that the heads wanted to wear to a knife-edged shape where they met in striking. After they had worn so as to be no longer safe I took them apart and forged new heads and welded them in. After that the jars gave good satisfaction.

At another time, not having at hand suitable material, I made a new link to repair a broken pair of jars by splitting a piece of 1½ by 3-inch stock, welding in a slug to form the head, as shown at F. This fix proved satisfactory and the jars were still serviceable three years afterward. Nothing seems to take the place of well-forged stock for jar heads.



A MANURE SPREADER BUILT FROM WASTE MATERIAL

The smith can make the tools and often very good ones, but he cannot always furnish the driller with good judgment in using them.

More tools are broken by careless, haphazard usage than are worn out by actual service. We should all remember that we can make nothing so strong but that it may be broken by reckless usage. Thirty years' practical experience with drilling tools has taught me that in the majority of cases the driller will get the hole out of shape before the tools are broken. All the smith can be expected to do is to make the drilling tools as best he knows how. The driller

then has only himself to blame for any failure of the tools from careless or improper use.

How I Build Manure Spreaders.

C. M. SOWARD.

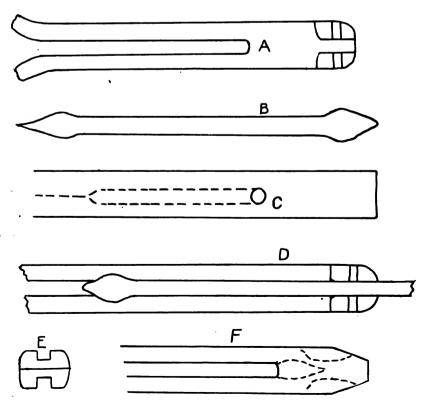
The accompanying engraving shows what I do with some of the waste material in this vicinity. This spreader is almost exclusively built from binders that have outlived their usefulness. It requires two binders to make one machine. I have built four of these spreaders during the past winter and every one is giving perfect satisfaction. They are all of the endless conveyor type and drive from both rear wheels. The front wheels are made from the trucks used to transport the binders. The box is 10 feet 8 inches by 40 inches by 15 inches, inside measurements. The conveyor is fed back by a ratchet, not clearly shown in the picture. The main bearings are on rollers—being found in the binder. These machines pull very easily and but two horses are required.

I have a power shop equipped with an emery stand, power drill, a trip hammer, a screw-cutting lathe, a spoke-tenoning machine and last, but not least, a washing machine. I was considerably interested in the Editor's talk on waste, in the April number, and therefore show how I utilize waste.

Utilizing Waste Heat.

D. FOSTER HALL.

Some people think that the blacksmith ought not to take any interest in things, except those pertaining to his shop and trade. He certainly should have as much interest in his family and home as in his shop and tools. The engraving shows an appliance for the economy and comforts of the home.



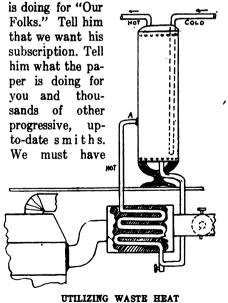
THE SMITH MAKES THE TOOLS, BUT HE CAN'T MAKE THE DRILLER USE GOOD JUDGMENT

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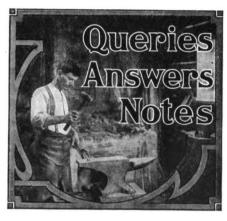
Although the idea of utilizing waste heat for furnace is not new, vet the details shown here are original, and this device is the best for the reason that it can be so easily constructed. Every mechanic knows how difficult it is to make coils. This appliance consists of a drum, made of galvanized iron, 14 inches long and 10 inches in diameter, located on the smoke pipe next to the furnace, using the heat after it has done its work in the fire box of the furnace. Inside the drum are ten pieces of 3-inch pipe, threaded on the ends and screwed into returns arranged in circular form inside the drum. These pieces should be 10 inches long. The engraving shows the cold water pipe, which enters at top of the water boiler and goes to bottom through inside pipe, as shown by dotted lines on sketch. From there it goes to the piping inside of the drum. From the drum piping the hot water goes back to the boiler, entering at A, as shown. By this method of heating we have a great heating surface inside the drum and water can be kept at a high temperature in the boiler without any extra expense for fuel.

Tell Your Neighbor.

"Our Journal" now contains twentysix reading pages regularly every month instead of twenty-four. Won't you tell your neighbor? Tell him how THE AMERICAN BLACKSMITH is steadily improving. Tell him what "Our Journal"



that fifty thousand, and if you get just one new subscriber for us and every other regular reader does the same we will quickly touch the fifty-thousand mark and pass it. It means six months' credit on your own account if you send in a new subscriber.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Jars for Artesian Wells.—We shall be glad to know how jars for artesian boring plants are made. Some reader or contributor can no doubt favor us with this information.

B. T. P., Australia.

A Nebraska Trade School.—Can some reader of The American Blacksmith tell me where to find a trade school in Nebraska. One between Grand Island and Omaha preferred. L. S. F., Nebraska.

Welding Rings for Piles.—Would one of your subscribers give their method of welding pile rings out of two by one and a half or three by two and eighteen inches in diameter?

E. Wansbrough, West Australia.

For Tempering Plows.—I use raw linseed oil for the bath and heat the plows a little hotter than cherry red. I dip about twice in the oil and almost cool off and then put the plows in the slag tub to cool off. I always have good results, as we have plenty of rocks and gravel here.

John F. Koenig, Missouri.

Shoeing for Paddling.—If I use a keg shoe I weld a piece on the toe of the shoe, letting shoe extend straight out in front from the toe to the first nail hole on the outside. Then I roll the shoe on the inside of the center of the shoe, thus making the horse break in center of foot instead of outside. Louis Ferrell, Missouri.

A Note from Kansas.—The American Blacksmith is one of the best magazines I ever read. I find a great mine of good information in it. I have pretty hard work. The first day of May I sharpened fifty-one Lister Lays. I do not use a file to touch them up, but just hammer them out. I average thirty-two to fifty-five a day. I wish I had time to write more.

D. J. COUCH, Kansas.

An Automobile Query.—I am building an automobile and would like to ask just one thing: What would be the best and simplest way to make the equalizing gear on the rear axle. I am going to use friction transmission with single-chain drive to live rear axle. I was quite taken up with Mr. B. D. Hungerford's idea in the March number of 1908, but couldn't quite make out how he would apply it on a live rear axle. Andy Rairie, Wisconsin.

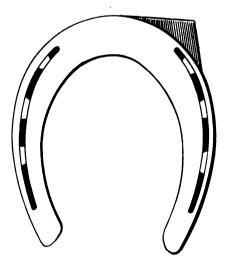
Tempering Plow Shares.—I would advise Brother Richey of Illinois to take twenty-five gallons of rain water and mix in about twenty-five pounds of salt for a bath. This will toughen the share. To harden it take a can and punch one end of it full of holes. Fill it with powdered cyanide of potash, heat your share to a nice light red heat and then sprinkle the cyanide over the face of the share and allow it to melt. Then cool it in the bath. This will harden it and you will have a good scouring share and hard. I have tempered shares for nine years like this with very good success.

WM. W. Wence, Iowa.

From British Columbia.—I am well pleased with "Our Journal" and I think that no fair-minded blacksmith can find fault with it. I look forward for every issue. I have nothing to say about the kicker. He has taken his medicine like a little man and has made only one little kick that I have noticed; and for all the medicine that has been administered I think he is all right now. You men of The American Blacksmith keep right on the way you have been doing. I think it is all right. If you try to please all the craft you will wind up by pleasing no one.

LEWIS MCNEILL, British Columbia.

Cement and Concrete.—When one takes up a journal of the day and reads of the many uses to which cement may be applied the reader cannot help but be surprised. It has occurred to me that there are many uses in and about vehicle factories where the same would be of great value. It would be an excellent substitute for brick in the construction of forges, tire furnaces, washstands, varnish room floors, also to construct wet rooms for the storage of gasoline, benzine, turpentine, oils and varnish, or in fact anything inflammable or of a character which promotes spontaneous combustion. More could be said on the subject, and maybe we'll say it



A SHOE FOR THE PADDLER

on some future occasion when time permits.

JOSEPH EBERLE, New York.

To Fasten Machine to Concrete Floor.—
I would like some brother smith to help
me a little. I have a job to do in a creamery. They want me to put in a churn
that runs by power and the floor is of

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concrete. Now, I would like to know through "Our Journal" how to fasten the churn to the concrete floor. I have one way which I think is pretty good. But I'd like to hear from some other brother smith. H. A. HENKE, Illinois.

In Reply.—Expansion bolts will, without doubt, solve the problem for Brother Henke. These are easily applied and can be procured at any supply house or jobber. These bolts can be used to hold the frame solidly to the floor while the churn is fastened to the frame in any manner that may be convenient. depending upon the style and shape of churn used.

J. H. K., New York.

To Toughen Plow Shares.—Brother Fred W. Richey wants to know how to temper plow shares to make them hard and tough. I will say in the first place that he must know his steel or he cannot temper it as he likes. If he is sharpening factory shares he must know or acquaint himself with the steel that the factory uses in making their shares, for they don't all use the same steel. For instance, the F. D. Plows have a very hard, high carbon steel in their shares, while the Case has a very soft steel and will temper with dark red heat, while the F. D. must not be plunged at a red heat. Their heat must be black. In sharpening don't overheat your The way I temper I bring my share to an even heat from point to heel and the proper heat for that particular steel and immerse it in my slack tub, and my shares stand up better than any smith's in town. I turn my share bottom side up while heating and hammer on top side. DAVID CANTWELL, Oregon.

A Letter from North Carolina.—In reply to Mr. Robert Green, South Africa, I would tear down that wheel and rebuild it. If a man is not willing to pay you enough to do his work right, don't do it.

I see there is a good deal said about apprentices. I must say I think there are more natural born blacksmiths than the schools ever made, admitting that we need the experience of others.

The Editors of "Our Journal" ask for items from practical men. The most of our craft are hard-working men who do not have time to give to reading and writing, and the spirit of criticism is running so high in "Our Journal" that we are afraid to tell our simple way of doing work. But I am writing this with the hope that the country blacksmith may find something that will help him along his toilsome journey, C. R. COVINGTON, North Carolina.

A Missouri Shop.—My shop is 30 by 40. I have a Mayer's Cold Tire Machine and a three-horsepower gasoline engine with which I run my drill press, emery grinder, ripsaw, wood lathe and a washing machine, and I intend putting in a band saw soon. I have all the work I can do in the busy season. I employ two hands beside myself. I do everything in the repair line, from plow sharpening to repairing a steam engine. My side lines are handling farming implements, paints and oils.

In answer to M. & R's. inquiry in the February number about the Mayer's Tire Setter I would say, I have used a Mayer's machine for the last four years, and I can cheerfully recommend it to all who wish to

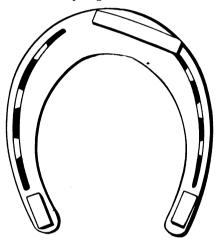
purchase a cold tire setter. This machine does the work perfectly and does it quickly. It is a great labor-saver and money-maker, and you make no mistake in getting one.

W. S. Smith, Missouri.

A Shoeing Hint.—A good way to shoe a "nigger-heeled" horse, i. e., one that toes out, is as follows: First cut the foot level, take a light shoe, heel it up, doesn't make any difference whether side calks or heel calks with no toe, then let the owner or driver drive him for a week or two until the shoes wear sufficiently to tell which way he is breaking. Then set the toe calk the way he is breaking, if he wears to the outside of one and the inside of the other, set the toes according to the wear.

Chas. Campbell, Indiana.

An Iowa Price List.—Brother William Banworth, of South Dakota, expresses the idea that every forge should have a license



A SHORING HINT

and be taxed not less than fifteen dollars a year. This would require the passage of a law, and I think it would be well worth the trouble. How many shops are there in your county, brother? Just stand in your shop door and look out over the country and count the shops, and then look at yourself and see how much work they are taking away from you.

If a farmer blacksmith should happen to come to my shop with a plow I never do his work even if he is willing to pay double price. Now, brothers let's stick together, and we may gain something along this line.

Here are some of my prices:

Tiere are some or my prices.	
Set one old shoe	\$.25
Set one new shoe	.50
Set one new steel-plug shoe	.60
Set one Neverslip shoe	.65
Sharpening plow	
Pointing plow	
New plow lay, 16-inch	5.00

All other prices proportionate to the above. W. BROCHWAY, Iowa.

Just a Few Thoughts.—If I owned a horse and took it to a shop and the blacksmith put a hot shoe on its foot I would never go there again. If that blacksmith was fitting iron to wood, would he put the hot iron on the wood?

If a horseshoer learned how to do other blacksmithing by reading The American Blacksmith would it hurt him? Some seem afraid to read about anything but shoeing.

Would The American Blacksmith be gaining subscribers by being published twice a month and by raising its price? Maybe it would, but then again perhaps it wouldn't. Some smiths, I think, have felt a generous streak and really didn't mean what they said. Some may want to know things oftener, but they must do a little thinking themselves. There is no brother thinks more of The American Blacksmith than I do, but I want it to last and be a success. Not go like a rocket up bright, and down and out just a stick.

Can some brother tell me how to forge a good-shaped claw bar for railroad work? Hope I haven't offended anyone by writing what I think. J. MULLARKEY, New York.

Some Alabama Prices.—There should be a law allowing no man to shoe a horse unless he had passed an examination. I hope this law will be in practice soon. Down here in the South we have to fight all the time as the farmers want their work done so cheap. But I do not take a cent off my prices. I started about four years and a half ago and had forty dollars. Now, I own the lot with the shop on it, and also have an eight-horsepower engine, an emery wheel, a band saw, a rip saw and a Brooks cold-tire setter. The following are a few of my prices:

and a rem or may prices.	
Four new shoes	\$1.35
Two new shoes	.65
Resetting of four shoes	.80
Setting of wagon tires, cold	2.00
Setting buggy tires, cold	2.00
Setting buggy tires if taken off	2.60
Front bolster \$ 1.75 to	3.00
Hind bolster	2.75
Wagon tongue	2.25
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I do a general repair business and do my work right and thereby gain the name of a good workman, but my prices don't suit everybody. G. KAPPINS, Alabama.

The Apprentice Question.—There is a great demand for boys to learn the blacksmithing trade but I think that some of the trouble is with the smiths in some parts of the country; as a general rule they are too selfish. In this part of Pennsylvania there are very few boys learning the trade and the smiths are all getting old and no new smiths to take their places. What has hurt the boy is some of these half-blacksmiths. They start up for themselves and say that they never learned the trade and that they can do anything. I would like to see some of their work and the prices they get. I served three years as an apprentice and worked seven years as a journeyman. I worked at the trade for twentythree years and am not near done learning, vet.

I think C. C. Richter's article is all right on the apprentice. The boys all want to make a living easier than blacksmithing as they think it is too hard work and they all want to go to school. I think there is no finer trade than to be a good smith.

Well, as to our paper, I am well pleased with it, as I think any broad minded man will say. There are lots of articles on different kinds of work that I do not do, but I like to read them and try to learn.

E. V. BYERS, Pennsylvania.

Examination Laws and Licenses.—In reply to Brother Andrew McLain in



regard to examination laws and boards for licensed horseshoers. In my opinion, such should be in effect all over the country. The poor horse should have proper protection as far as the horseshoer goes, and it certainly is not possible for a man to learn to be practical at shoe turning, and not know or understand the anatomy of the foot and the same time believe himself a good shoer. There are men that are good at forging and, no doubt, could make any style or shape shoe you wanted. But, at the same time those men could not do a proper or anywhere near a perfect job on a horse's foot. We can always make shoes, but we can't make feet. One of the primary considerations for those who have the shoeing and management of the horse's foot should be the acquisition of knowledge of its structure and functions in health sufficient to enable them to understand the relative texture and uses of the parts with which they have more particularly to deal. If the artisan does not possess this knowledge is it possible that he can practice his handicraft to advantage or minister effectually to the varied requirements of the animal? It must be admitted that he cannot do so and it is from neglect of this fundamental consideration that so much improper and vicious shoeing prevails and so many horses are crippled and worn out. A. M., Pennsylvania.

An Interesting Idaho Letter.—I have learned more from THE AMERICAN BLACK-SMITH in one year than some of my fellow craftsmen have learned in five years as apprentices. I have noticed that a great many insist that all smiths should serve as apprentices. Well, I will agree with them inasmuch as mechanics are concerned, but there are a great many who served as apprentices in the smithing trade who should have learned to be sailors. Their welds look more like sailor's knots than like welds. And you can tell these men out of the shop as well as in it. They know it all, and you can mention any book or paper devoted to the smithing business and ask them if they have read it and they will say, "Yes, I have read that book, but it is no good." You have met those fellows, have you not? Well. here is a man writing now that can get some good ideas out of even Ayer's almanac. I started in the blacksmithing business three years ago. Up to that time I had never welded two pieces of iron together. I had a thirty-pound cast-iron anvil, one old hammer, an old bellows, one old pair of tongs. If ever you come out this way, call in, and see what I have now in the tool line. Here are the two secrets: Common sense and THE AMERICAN BLACK-W. S. FLEMING, Idaho. SMITH

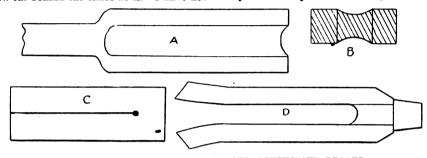
That Well-Drilling Jar.—I think if Mr. Dearness of Queensland will make the proper tools and use the following plan he will have no trouble with his all-steel jars. Take a steel billet of a size suited to his finished jurs and punch a hole about five or six inches from one end and then split from hole to long end. Then spread wide enough to insert a mandrel made the shape of the jar reins when finished. Then put under the hammer, and by using the proper swedges he can

draw his reins to size and shape. The short end is for the battering head and is forged to proper shape by using fullers. In this way the jars are made with two welds in each set. I have helped to make a good many sets this way. In the engraving. A is the mandrel for drawing out the reins, while at B is shown an end view. At C is shown the steel punched and split ready for forging. At D is shown the finished half of jar ready to weld.

C. K. CORNELISON, Pennsylvania.

A Letter from Georgia.—Hurrah for "Our Journal" and the craft. Let the kicker go right on. Possibly some day he will kick his eyes open and then he will see how far behind the times he is. I have not

for fitting the shoe to the foot, it is the only way. In special cases, however, it is of advantage to fit differently. For instance, if a horse walks on his toes I find it is better to fit an ordinary shoe just as I would for a nice straight foot. I punch one extra hole at the heel on each side and trim the foot all at the toe, leaving more at the heel and placing the shoe forward a half inch past the toe for the first shoeing and the second time place it three quarters of an inch past the toe, always trimming at the toe and none at the heel. This extra part at the heel gives you sufficient to keep the shoe on. I have been shoeing two mules this way for some time and I find it proves very satisfactory. P. M. WADE, Tennessee.



THAT WELL-DRILLING JAR FOR OUR QUEENSLAND READER

found one thing in "Our Journal" that was not interesting. The only fault I find with it is, it does not come often enough. I would not be without it for four times its cost.

In Brother Robert Green's letter from South Africa is a question for vehicle men. I will say that dish can be taken out of wheels without breaking it. I have done it time and again. One buggy I have in mind, my customer wanted a general overhauling of the vehicle, except wheels; they were dished so bad he would buy new ones. The wheels were perfectly good, except badly dished. I told him not to buy wheels, that I would take the dish out.

Bolt the wheel down to the bench firmly, front down. Now take a round pointed punch and hammer and set the punch on the flange close up to the hub and hammer well all around the hub. Now, turn wheel over and set the punch on the edge of the flange and hammer well all around. You will find this method will work nicely, except in very bad cases. These you will have to put in a press by bolting to your bench and giving your spokes time to straighten, which will be a week or ten days.

D. J. Stevens, Georgia.

A Practical Talk on Shoeing .- I have just finished reading Brother Perrin's article on shoeing and find it to contain a lot of practical knowledge from what experience has taught me. I have been shoeing for some time and it seems to me it is almost impossible to tell or write just how to shoe each and every horse. I hardly ever find two horses upon which the same shoe will fit perfectly. Most always the shoe has to be changed in some way. I, also, often find a horse with feet of different shape-one will be sound and the other long and narrow. In this case it sometimes requires two sizes of shoes to fit the horse. So my opinion about horseshoeing is that a shoer has to use a lot of good, common, horse sense if he wants to shoe all horses properly. As

The Apprentice Question.-I read with much interest the Editor's remarks regarding the dearth of young men willing to learn the time-honored trade of blacksmithing. While I agree with the Editor to a certain extent in the causes assigned I, after forty-five years of experience behind the anvil, believe and know that there are other causes which I fear are hard to remedy. I have in my time trained a number of young men, who are all doing well in our calling, but that was many years ago. At that time I had numerous applications from farmers who offered their sons to learn the blacksmithing business and who considered themselves fortunate when I consented to take them on. In the last twenty-five years things have materially changed. Not a single application was made and no apprentices can be found in any shop in this locality. What caused the change? Why, the abhorrence of soiled hands to some extent is a factor and young men seek other, cleaner pursuits. The wages paid farm hands have more than doubled, so that when a boy after the school age of fourteen years was able to be of some use to the farmers and could be spared at home he could at once find work such as he had been brought up in at a handsome figure with some other farmer. That being the case the lad was kept at a business which needed no three years to command good wages, besides being allowed to keep a horse and top buggy for his own use. The prospect of a three years' apprenticeship is not very enticing, and those who are willing to take in a young man to learn the trade can simply go begging.

Another cause was the cheap prices paid for blacksmith work, especially horse-shoeing, but this I am glad to say no longer exists. Farmers are getting alarmed and the question is frequently asked, "What will become of us farmers when

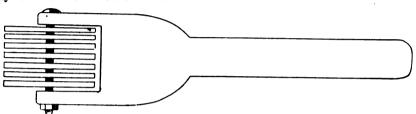
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the older smiths have to quit? We see no one to take their places." This is in my opinion the main cause of the scarcity of procuring help in the shops. A remedy I have no means of suggesting. Perhaps those before stated, by the Editor, may partially fill the vacancies, but I don't believe they will be able to fill the positions as well as those trained as apprentices in the shop. George Nablo, Ontario.

How to True a Grindstone.—Take a piece of hardwood or iron, if preferred, two and a half or three by one and a half by twenty inches. Cut a notch in one end two inches wide by one and a half inches deep and bore a hole through the two lips for a half-inch bolt. Put as many half-inch iron washers in the notch

rims burned up he merely takes it for granted that the smith did his best, says nothing about it and keeps on having his wheels ruined. But just let him have a wheel ruined on a cold setter and he spreads the news far and wide. He forgets it was the same man who ruined both of them, hot and cold.

In setting tires, either hot or cold, only one thing is accomplished, that is, you shorten the tire or make it smaller. You can do this by cutting out a piece or heating it and compressing or setting it on a hot setter, or compress it cold on the wheel. What is the real difference? There is not a bit. All have done the same thing. It's the man who does the job in either case.



AN EASILY MADE TOOL FOR TRUEING A GRINDSTONE

as will go in freely. Put the bolt through the wood and washers, put on the nut and the tool is complete. It is necessary to hold on a rest at about thirty degrees so the washers will cut on the corners. Reverse the tool as uss and wear requires.

O. F. Godfrey, Vermont.

A Talk on Cold Tire Setting.—There is much discussion going on about cold tire setting and I want to say a few words and I want to talk right plain to the craft. I know what I am talking about for I have had much experience in this matter.

Is cold tire setting a success or not? That is what blacksmiths want to know. I say it is a success and I say it is a failure. too. Now, let me explain. Every cold tire setter I ever saw was capable of doing good work. The principal of all of them is the same, that is they compress or set the tire while on the wheel. They save at least seven eighths of the time it takes the old way. Then why is it so many condemn them? Will you let me answer and tell the whole truth and tell why I said above they are a failure as well as a success? It's the man, ninety-nine times out of a hundred. The trouble in our trade is that there are so many smiths who ought to be plowing, or digging ditches or something like that.

Now, let's be downright honest about this matter and ask how many smiths out of one hundred can set a tire hot and do it exactly right? How many will overdish a wheel? How many will burn up the rims or burst them? How many can take four wheels and give everyone the same dish? How many can shoe a horse as he should be shod? How many can temper a tool? How many do real first-class work all the way through? I am glad to say there are a great many, but what about the vast number who cannot?

Cold tire setters do what you make them do. They cannot set a wheel by themselves. If a man goes to a shop and gets his wheel over-dished and his Therefore, I say that cold tire setting is both a success and a failure, depending on the man. I know what I am talking about, for I have tried them enough to know and I have seen enough of the men who condemn these machines to know, too.

OLD TIMER, Missouri.

An Interesting Southern Letter.—The magazine is just right as it is without any changes whatever, unless you see a way to improve along the same lines. It is worth to me far more than the subscription price of just such reading as I am interested in. The "other fellow" is entitled to the part which does not interest me.

I picked up the shop business after I was twenty-five years old and had a considerable and growing family. I make or mend whatever comes to my shop from a sewing needle to a locomotive, and in wood from a hammer handle to a full grown wagon. No, I do not manufacture locomotives, but have repaired them.

The prices in different locations have quite a wide range. It is interesting to note the difference. I notice in the December number a letter from a fellow in Mississippi which shows quite a difference in the prices of work in the same state, as will be seen by a partial list at my own shoo. These differences, as a rule, are caused by the difference in the cost of material.

I get for two-horse thimble skein axles, front, \$2.50; rear, \$2.25. Bolsters, back \$1.25; front, \$1.50. Hounds, front, using old iron, \$3.00; back, \$2.00.

spoking wheels of wagon up to 24	
inch	1.50
Spoking wheels of buggy	1.75
Rimming wagon—\$1.50—Buggy	1.75
Filling new wagon \$3.00—Buggy	3.00
(This includes a good coat of paint)	
Wagon tongue	2.50
Reach poles	1.25
Head blocks	1.00
Pole circle	.75
Spring bars	.50
Reaches, each	.50
Sharpening any point	.10
Pointing plow points from \$.25 to	.75
- conting proviposition with the total	.,,

Cutting, welding and setting wagon tires to 1\frac{2}{3}, \ldots \ldots

And all other prices in proportion. I get as high as \$30 for overhauling and repairing hay presses. My motto is "Please the customer by giving him a first class job, at as close a price as good work can be done."

I do not shoe horses, as I am not big enough. I only weigh one hundred and fifty pounds and don't like to fool with them. I get plenty of work without it. I have never had any help except when my boys are out of school. I have no power, but expect to install a gasoline engine, soon.

C. C. Anderson, Mississippi.

On Prosperity and Gas Engines.-In my AMERICAN BLACKSMITH for February I see a picture of H. H. Zimmerli's shop, of Illinois By the looks, it certainly must be a pleasure to work in such a place as that is, if he has power and machinery to do the work. Now, it takes some money to stock such a place up to start on. He said that when he came thirteen years ago, there was a shop twenty by forty and half of that was stable. He said that he made in round numbers an average of twelve hundred dollars a year clear gain, and that he had built a store to cost \$1,200 and a house to cost \$1,200, bought a small farm at \$4,680 and also a farm in Minnesota at \$8,000 and also rents a sixty-acre farm at \$300 on which he has raised three thousand four hundred bushels of corn, has one hundred hogs and ten horses. He says, "I just write this that you may judge whether or not I am busy or how busy the other brother was." Now, Brother Zimmerli does not say how much help he has to do the work or whether he has power in the shop to do the work or anything as to how he got a start. I have a neighbor who spreads himself and tells how he made the first hundred dollars and how he made the next fifty and so on, and that he worked from three or four o'clock in the morning until ten or eleven at night. He says he has so much money invested in bank stock, so much in his farm and that he paid so much for that, and so much in buildings, lots and mortgages and such like. But he does not say anything of the ten or twelve thousand dollars that his wife got from her father and of the twelve or fifteen thousand dollars his father left when he died. Oh, no, that would not do. It does not sound so good as to spread himself and say I done it thus and so. Now, Brother Zimmerli might have had a start, and if a man has a start and does not get a kick backward he can make it go forward with the machinery to do the work as it is now.

Now, a few words in regard to the gasoline engine. I have often wondered why they did not turn up fifteen or twenty years sooner than they did: as they are one of the greatest necessities ever invented, and I think that a blacksmith and wheelwright shop should have one as well as the farmer that has about four or five days' threshing, woodsawing etc., and then runs his blacksmith and wagon repairing bills from one year to another. That man who must do without the engine and rip out his wagon poles and hounds by hand is usually snarled at because he charges too much for his work. Jeremiah Miller, Pennsylvania.



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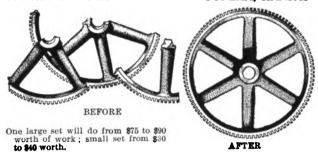
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Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, May 15, 1909, and are subject to fluctuations. Corrected for The American Blacksmith by The National Heavy Hardware Reporter, Chicago.

Decided advances will be noted in both Cupped Oak Hubs and Plain End Oak Hubs. The reason for these advances, correspondents say, is the fact that few oak hubs are sold at this time and the loss in carrying them in stock is greater than any other article in wood stock.

Correspondents in all sections report improved business, and if crop indications are reliable the blacksmith and wagon maker will do a good business throughout the balance of the year.

Prices on iron and steel are reported much	firmer.
Horse Shoes All Iron Shoes Steel Shoes No. 0 and No. 1 25c, extra. 15c, per keg additional charged for packing more than one size in a keg	\$4.40 4.25
Mule ShoesX. L. Steel Shoes	4.90 5.50
Tip Shoes	6.00 5.75
Goodenough, heavy Goodenough, sharp	6.00
ioe weight	7.00
Side Weight E. E. Light Steel Steel Driving	9.25 5.50
O. O. Mule Shoes, extra	5.50

O. O. Mule Shoes, extra	. 1.50
Merchant Bar Iron— \$1.70 to \$1.90 rates full extras, and 20	cente non

Merchant Bar Iron— \$1.70 to \$1.90 rates 100 pounds extra			. 1.5
	s full extra for broke	as, and 20 en bundles,	cents pe
Steel Bars— \$1.60 to \$1.80 rate	s, full ext	ras.	
Toe Calks— Blunt Sharp	•••••		Per box . \$1.36
Carriage Bolts— 6 x 2 and smaller Larger and longer.	• • • • • • • • • • • • • • • • • • • •		.60–10°7
Machine Bolts— 4 x § and smaller . Larger and longer.			
Nuts— Less than 10 lbs. of From 10 to 50 lbs.	a size	· • • • • • • • • • • • • • • • • • • •	\$2.50 of 3.00 of
Washers— Same price as nuts.	Skeir Ca	ıs— .st	65%
Maileables— Common \$.	Half	Patent Axi	
Springs— Single Spring, each Springs, black and h			
Hickory Lumber—Per 1 to 2½ 2½ to 4½	Foot—		\$.09½
Ash and Oak Lumber— 1-1½\$.0 1½-20	-Per Foot-	_	\$.08 .09
Yellow Poplar Lumber-	-Per M. F	Peet_	
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7,	\$65.00 65.00 68.00 72.00	68.00 75.00	18 to 24 \$75.00 80.00 85.00
Rough Hickory Axles—	65.00 68.00 72.00	68.00 75.00 80.00	\$75.00 80.00 85.00 104.00
Rough Hickory Axles— 3 x 4 6 ft 3 ½ x 4 6 ft 4 x 5 6 ft	65.00 68.00 72.00	68.00 75.00 80.00	\$75.00 80.00 85.00 104.00 Each. \$.60 1.00 1.20
Rough Hickory Axles— 3 x 4 6 ft	65.00 65.00 72.00	\$65.00 68.00 75.00 80.00	\$75.00 80.00 85.00 104.00 Each, \$.60 1.20 2.20 1.30 2.00
Rough Hickory Axles— 3 x 4 6 ft 3 x 4 6 ft 4 x 5 6 ft 5 x 6 6 ft 4 x 5 6 ft 4 x 5 6 ft 5 x 6 6 and 7 ft. 5 x 6 6 and 7 ft. 7 ft	65.00 68.00 72.00	68.00 75.00 80.00	\$75.00 80.00 85.00 104.00 Each, \$.60 1.20 2.20 1.30 2.00
Rough Hickory Axles— 3 x 4 6 ft	65.00 68.00 72.00	\$68.00 75.00 80.00	\$75.00 80.00 85.00 104.00 Each, \$.60 1.20 2.20 1.30 2.00
Rough Hickory Axles— 3 x 4 6 ft 3 x 4 6 ft 4 x 5 6 ft 5 x 6 6 ft 4 x 5 6 ft 5 x 6 6 and 7 ft. 5 x 6 6 and 7 ft. 5 x 6 6 and 7 ft. Finished Hickory Axles	65.00 68.00 72.00	88.00 75.00 80.00	\$75.00 80.00 85.00 104.00 Each, \$.60 1.20 2.20 1.30 3.50 \$1.00 1.26 \$1.00 1.26 1.36 1.30 1.30 1.30

Rough Oak Wagon Tongues— 4 x 4 x 2 x 4 x 12 and smaller

4 X 4 X 2 X 4 X 12 and smaller.

Finished Oak Wagon Tongues—

3 and smaller.

3 4

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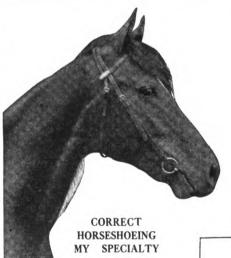
JULY, 1909

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WANTED—First class experienced traveling salesman to sell blacksmith and wagon-makers' supplies in eastern Ohio. Address. A. B., care of American Blacksmith, Buffalo, N. Y.

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American Blacksmith Company, Box 974, Buffalo, N. Y. FOR SALE—Shop 20x40, tools for two men and well-stocked four-room house on same lot. A snap if sold in June, for I have other work. Write to S. MUELLER, Thurman, lowa.

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FOR SALE—Jointer Heads, 6, 8, 12 and 16-inch, complete with knives, boxes and pulley. Made of a solid bar of steel. Made to bolt to wood table, which any blacksmith can readily make. Also a combination saw arbor and jointer head. Address, W. L. SHERWOOD, Kirksville, Me.

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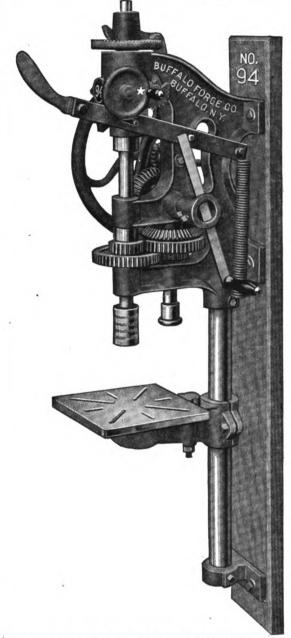
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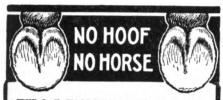
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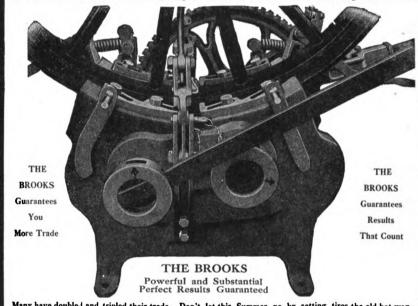
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The Brooks makes the Smith rich

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Then look at the other tire setters in this magazine; we invite comparison. Is it difficult to decide between light, frail machines and the heavy powerful Brooks? Notice how compact and simple is the Brooks, yet how well constructed and solid it is. Nothing to break or get out of order, will last a lifetime. The Brooks is easy to operate and positively gives the most perfect and finest results. The Brooks sets tires better than any other cold tire setter made. Don't waste your money on other cold tire setters. Buy a Brooks and get the best. Thousands of Smiths all over the United States and Canada are using Brooks Cold Tire Setters and are increasing their business.



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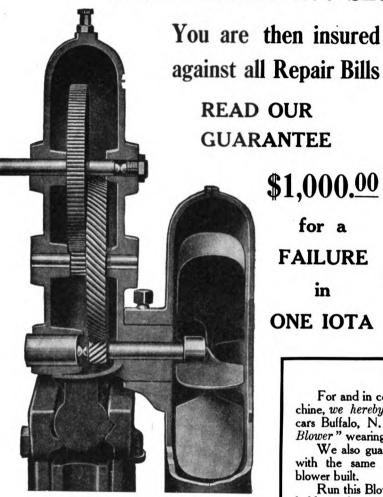
Double Bead with Oval Back When used on Round Cornered, Oval or Round Bows, they are ready for the Duck as soon as nailed on Bows, as no work is required dressing off corners on back of slats to keep from cutting into the covering. 1½" wide in 8', 18' and 12' lengths. 1½" wide in 10', 12', 14' and 16' lengths. Single Bead with Straight Back For Flat and Coach Top Work where slats are placed close over entire top. One with only-1½" in 10', 12', 14' and 16' Lengths.

ALSO HICKORY PLATFORM-GEAR-SPOOLS AND HICKORY BENT-SEAT-STICKS

Don't Worry and Struggle with the Antiquated Heirloom Get a "Buffalo 200 Silent Blower"

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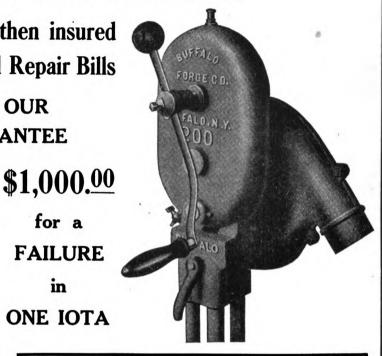


See simplicity of construction

Reasons This Strong Guarantee Is Possible

The fan case of the "Buffalo 200 Silent Blower" is so constructed that it

NEW YORK



Guarantee Certificate

For and in consideration of the purchase price of this machine, we hereby guarantee to replace, free of charge, f. o. b. cars Bulfalo, N. Y., any parts of the "Buffalo 200 Silent Blower" wearing out within ten (10) years.

We also guarantee this Blower to produce a stronger blast with the same number of turns of the crank than any other blower built.

Run this Blower 24 hours per day and the guarantee still holds good. BUFFALO FORGE COMPANY.

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President.

Delivers More Air Per Turn of Crank

than any other blower. Nature's law is observed. The delivery is along the line of least resistance and without any loss.

The Greatest Blast With the Least Power

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THE BEST ALL AROUND
In form and finish. Made of the best Swedish iro Union Horse Nail Co., Chicago, Ill.

See Page 17 for Index to Advertisers.

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To Find Address of any Firm given here, consult their advertisement. For its location in this issue, see Index on Page 17.

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Eagle Anvil Works.
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H. K. Porter.

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American Calking Mach. Co.

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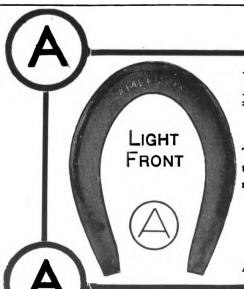
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It is made heavy enough to withstand all strains and will last a lifetime.

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Is it not preferable to make your selection from the most complete line and the best shoes on the market?

United States Horse Shoes

"In a Class by Themselves"

Our Illustrated Catalogue shows all sizes and patterns. The book We will gladly send a copy to your address. Write today.

We are giving away a handsome souvenir stick pin to every smith who sends his name and address. Did you get one? Don't wait until they are gone. Write today.

United States Horse Shoe Company Rolling Mills and Factory, ERIE, PA.

Trade Literature and Notes.

Trade Literature and Notes.

THE "RETURN OF PROSPERITY" is imminent as the Foos Gas Engine Company of Springfield, Ohio, tell us that during May their business was larger to some extent than that of the same month of any previous year. The month of April showed the largest business ever done by the Company in a single month, and the first five months of the present year show a greater business than has ever been done by the Company in the same period. This firm advises us that they are adding to their facilities, anticipating a still larger increase in business. The entire plant is devoted to the manufacture of gas engines and is now being worked to its fullest capacity. The latest Foos catalog is No. K, and will be sent to all interested parties.

J. H. SESSIONS & SON of Bristol, Connecticut.

Its fullest capacity. The latest roos catalog is No. K, and will be sent to all interested parties.

J. H. SESSIONS & SON of Bristol, Connecticut, are manufacturing a safety spring for whiffletres and neck yokes, which, as is stated by the manufacturer, was invented by a blacksmith who demonstrated its superiority to his own customers before it was placed on the market in a general way. It is said that it is simple in construction, every part being in plain sight, with nothing to get out of order. Easily operated, all that is necessary is to depress the top, which can be readily done with cold or gloved hands, there being no jumbling with small or concealed springs. Ice, snow, sleet, sand or mud not interfering with this ease of operation. It is impossible to unhitch by a chance blow and can be used in connection with wrought, forged or maileable hooks, or in fact any hook used with ordinary flat springs.

THE REMY ELECTRIC COMPANY of Anderson,

ordinary flat springs.

THE REMY ELECTRIC COMPANY of Anderson, Ind., sent us one of the neatest little booklets it has been our pleasure to review in some time. "A Tale of a Tour and Worth of a Magneto Told by a Kodak" is the title of the book which is very neatly bound in flexible leather covers with title in gold. The entire book is devoted to photographic illustrations depicting the adventures of two tourists on a trip through Florida's swamps in an automobile equipped with the Remy High Tension Magneto. It is a very excellent advertisement for the Remy device as well as for the Buick car which made the trip. Those readers of THE AMERICAN BLACKSMITH who have taken up automobile work will do well to get a copy of this book in order to become more thoroughly acquainted with the Remy High Tension Magneto.

THE TIMKEN-DETROIT AXLE COMPANY

more thoroughly acquainted with the Remy High Tension Magneto.

THE TIMKEN-DETROIT AXLE COMPANY has recently been incorporated, with \$1,000,000 capital, to manufacture automobile axles in Detroit. Heretofore, the Timken Roller-Bearing Axle Company, Canton, Ohio, has made automobile axles in connection with their roller bearings, and the above new company was formed to take over the automobile axle business of the latter, and it will devote itself to the automobile axle business solely. The Timken Roller-Bearing Axle Company will control the new company.

Large and modern buildings located on Clark Avenue and Pere Marquette R. R. were secured a few months ago and have been made ready for occupancy. The drop forge plant, in connection, has been largely increased and other improvements made. All the buildings are equipped with automatic sprinklers.

The Timken Roller-Bearing Axle Company will change its name to The Timken Roller-Bearing Company, and continue to manufacture, at Canton, Ohio, roller bearings only. The entire factory that heretofore has been used for the manufacture of axles and roller bearings will be devoted to Timken Roller Bearings, Carriage and Wagon Axles only. This is the fifth time the business has been doubled in the past seven years.

WHY NOT

that will fit the spindle of your drill press, holding GROOVED SHANK drills 1/2 to 1/4 in. inclusive, with reducer to 4.? Drills held by this chuck are much cheaper than drills with 1/2 in. or 5/2 in. shank. Simplest DETROIT TWIST DRILL CO. and cheapest chuck on the market.

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228 21st Street, Detroit, Mich.

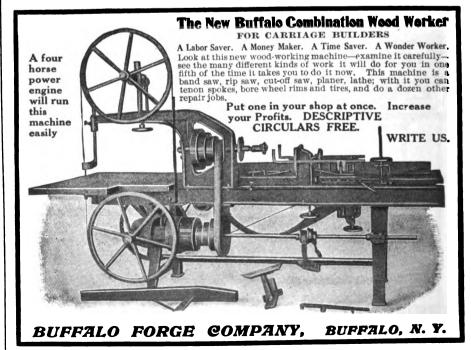
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OVER 5.000 in DAILY USE. GEORGE RAITHEL & SON.

Middleville, N. Y.



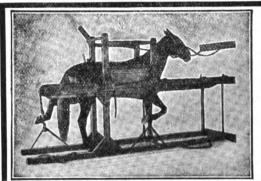


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Have given entire satisfaction for the past twenty years. They are no experiment. With proper care, will last as long as the building. Fire, lightning and stormproof. Light, durable, attractive. Will not crack or scale. Galvanized after embossing. Easily and quickly laid with hammer and nails; no soldering. Inexpensive. Write today for our catalogue. Address. 109 ERIE STREET.



METAL SHINGLE CO. CAMDEN, N.



Hemphill's New Shoeing Stocks

Shoes the most vicious horse in twenty minutes.

No payment required until you test stocks.

No payment required until you test stocks.

The sills rest on the floor; there is no strain on building. Easily placed in any sized shop. When not in use stocks fold against wall and occupy small space. Horse cannot lie down, rear or pull back. Feet are held firm and taut by flexible foot clamps. We do not use a rigid vise-like foot hold. Impossible to break or injure horse's leg.

These stocks have been used and tested for years, Price, circulars and testimonials free on application.

THE HEMPHILL HORSE STOCKS CO.

THE HEMPHILL HORSE STOCKS CO. Rensselaer, Indiana, U. S. A.



THIS horseshoe permits the horse to travel in the most natural manner with the greatest ease and protection.

Quickens the action of front feet.

Produces best fold of front leg.

Prevents stumbling, forging, bruising and cutting the quarters.

Made of best quality toe calk steel; in numbers 1, 2, 3 and 4, three weights to each size.

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Manufacturers BURLINGTON, IOWA

RUBBER AIR CUSHION RUBBER PADS



See That Cushion?

It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.



CHEAPEST

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THE BARCUS HORSE STOCK And the Up-to-date Shoeing Shop

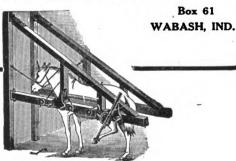
are usually found together. Is your shop upto-date? A Barcus Stock in your shop will make your work easier, will do away with all danger, will enable you to do a better job and will increase your earning and profits. It doesn't Soon pays for itself. pay you to be without one.

THE BEST ON THE MARKET

is the Barcus, because it is the most substantial and durable. It is perfectly safe and speedily operated. The first of its kind ever sold and the best today.

Get our descriptive catalog and prices, free. Write us now.

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IT WILL PAY YOU TO STUDY THIS

Scientific Hoof Pad

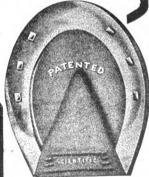
T conforms scientifically to the requirements of the hoof, having full width of rubber at the heel and permitting full shoe at

the walls of the hoof. It conforms exactly to the frog, which is thereby permitted to perform its natural functions of feeling the footing. Comfortable, clean and sanitary; always affording a perfect grip on slippery pavement.

The Acme of Perfection in Hoof Pad Construction.

Order a few trial sets from your jobber, watch their good service and performance on a few of your best customers' horses and you'll tie up to the "Scientific" for sound business reasons.

THE SCIENTIFIC HOOF PAD CO. YOUNGSTOWN,



No matter how seldom you use tools, you need the best.

"MORSE"

Drills, Reamers, Cutters, Chucks, Taps, Dies, Arbors, Counterbores, Countersinks, Gauges, Mandrels, Mills, Screw Plates, Sleeves, Sockets, Taper Pins, etc., are without question as good as can be made. Large manufacturers who have had a chance to try out different kinds already know this, and others are going to know it if telling will avail.



A postal card request will bring you a "MORSE" catalog. Better have it if you are in doubt as to what kind of tools you want.

Morse Twist Drill & Machine Co. NEW BEDFORD, MASS., U. S. A.

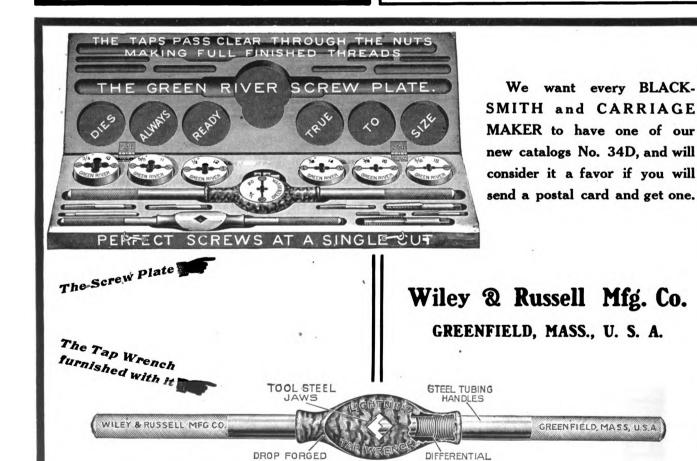


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That extra fussy job calls for "F-S" Coach, Car and Auto Varnishes and Japans.

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SCREWS



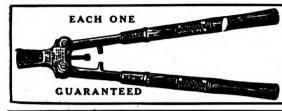
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for rolling steel and iron tire for wheels to a circle of any desired diameter. It will bend tire from the lightest to 10° wide by 1° thick. Is heavy and well proportioned. Furnished with tight and loose pulleys, with friction clutch pulley, or direct connected motor, if desired at an additional charge. We also manufacture solid steel loose collar axles and the National self-oiling tubular axles and steel stock and hog troughs.

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Manufacture and Sell-

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"ONE FIRE" Marvel, \$28.00 55.00 For 4 Light Fires, For 4 Medium Heavy Fires, 60.00 For 4 Heavy Fires, -80.00 120.00 For 8 Heavy Fires, -

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Are like all other "Milton" products—the best of their kind. We make them of every size and for every purpose. They are cut from plate rolled expressly for the purpose, by a special process, which insures their being true to gauge and well finished. Having exceptional shipping facilities we can guarantee prompt and satisfactory deliveries. Would be pleased to have you send us specifications when you are again in the market for this class of goods.

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We also make Hot Pressed and Cold Punched Nuts, Bar Iron, etc.



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Farmer's Handy Wagons All Standard Types

Special Inducements to Blacksmiths

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Made in High-Grade Malleable Iron.

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IMPORTANT

Axle Tie and Rear Perch Irons will be furnished for PLAIN AXLES unless SWAGED AXLES are specified when ordering.

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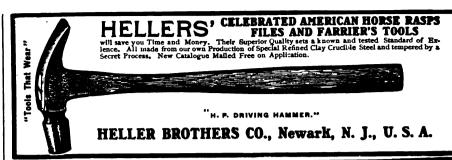


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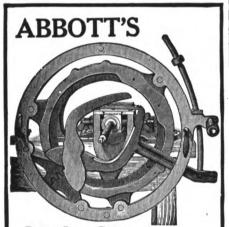


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It makes steel weld like iron. It has no equal for welding tires, axles and springs

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CORTLAND WELDING COMPOUND CO., Cortland, N. Y.



Little Giant **Hub Borers**

AND Abbott's Box Puller

Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers Machinery.

PHINEAS JONES & CO., Newark, N.J.

General Agents for the Eastern States



The Bruce Malleable Wagon Standard

Tested thoroughly and guaranteed strictly as represented. Note its great advantages over the old style.

Note its great advantages over the old style.

1. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers.

2. It is attached to boister by means of two bolts passing through bolster from the side, and one bolt from top to bottom of boister, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.

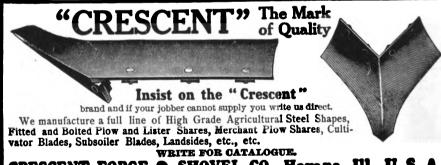
3. The Malleable Iron Standard has a 3½ in. face at base, which prevents wear on wagon box, while the old style has only a 3½ in. face.

4. Great time saver. Can be attached to bolster in one fourth the time required to put on wood stake. Adapted to new and repair work.

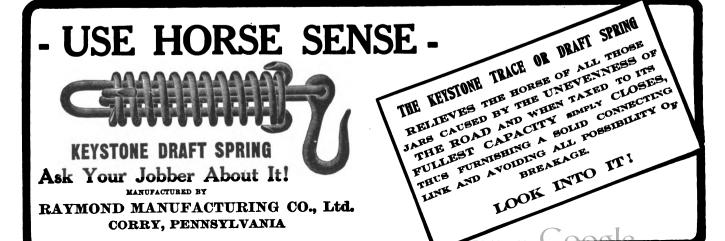
and repair work.

If you have never tried the Brace Standard, write today and ask for prices.

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Reece Combination Screw Plate No. 103

\$8.25 NET WILL BUY ONE



Build Your Own Motor Buggies

vehicles. Our Chassis as well as engine and all other parts designed al latest and best lines in high wheel construction. We furnish the Chassi Chassis complete

No Iron Working Machinery or Machinists Necessary.

Buggy can be finished ready to run without any iron working machinery inist whatever. Write for specifications and Catalog No. 151.

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The No. 103 Reece Combination Screw Plate

includes one Reece Adjustable Guide Stock, 24 inches long for 2 7-32 inch diameter DIES; Three individual Full Mounted Stocks; Seven Plate Taps and Seven Reece Adjustable Dies, cutting 1-4 — 20, 5-16—18, 3-8—16, 7-16—14, 1-2—12, 5-8—11, 3-4—10. REMEMBER that this is practically a FULL MOUNTED SET. REMEMBER that the Stocks have MOTTLED FINISH; that the DIES are adjustational series of the ser ble, and make perfect threads at one cut; that four persons can use dies from this set at the same time because there are FOUR STOCKS. And LAST, but not LEAST, REMEMBER THE PRICE is only \$8.25 NET, and the Screw Plate guaranteed to give satisfaction or your money will be refunded.

Can You Afford to Neglect This Great Opportunity?

We request you to place your order with your dealer. If for any reason he cannot fill the order (and he can if he wants to), THEN send to us. DO NOT ACCEPT SUBSTITUTES—INSIST on having the REECE COMBINATION SCREW PLATE No. 103.

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Steam Cooled **Double Piston** No Foundation

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THE PERFECT **POWER HAMMER**

The Only Hammer Made with extra long guides, insuring a direct vertical stroke of the ram.

The Only Hammer Made with a disk attachment with a special anvil for sharpening plow and harrow disks.

Made in three sizes: 2½ in. Sq. Ram, Wt. 30 lbs. 3 " " 40 " 4 " " " 80 "

Prices are right. Write any jobber or

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Universal Tenon and Boring Machine

for wagon repair shops. Cuts tenons on set of wheels in twelve minutes.



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ROTH FORGE BLOWER AND ENJOY LIFE

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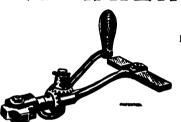
ROTH BROS., 451 W. Adams St., CHICAGO, ILL. NEW YORK OFFICE: 136 Liberty Street.

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Suitable for 1-8, 3-16 and 1-4

The MOST CONVENIENT wrench for new or old work. A great FAVORITE wherever

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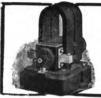
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The fuller and hotter the spark, the better and stronger the explosion, and the greater the efficiency of your engine. If you use ACME DRY BATTERIES you can always depend upon a hot, fat spark, strong, full explosions, and the maximum of efficiency from your engine.

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REMY MAGNETOS

Will start and run your Gas or Gasoline Engine without the aid of batteries. Inexpensive and absolutely reliable for either make and break or jump spark ignition. Information sent on request.

REMY ELECTRIC CO., Anderson, Ind.





"QUICK ACTION"
IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

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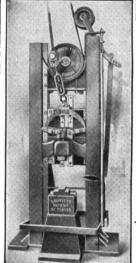
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WHEELS

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GRIFFITTS BELT POWER HAMMER

MADE OF STEEL Every Part Riveted

It is the strongest and most durable hammer made. The best all-around hammer for blacksmith and wagon shops. It will not get out of order; will not work loose.

This machine will help you do better, quicker and cheaper work. Get our full description and prices.

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QUALITY IS THERE

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TOE CALK

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PHOENIX

PRODUCT

You benefit by the most improved methods of manufacture, the best materials obtainable, the most expert workmanship and our years of experience when you buy

"Phoenix"
Products.



The best is the cheapest. If you want the best buy the

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Your dealer will supply you.

Humane Cushion Heel Horse Shoes



ARE THE BEST

Because they are the only cushion shoes that can be used on the country roads as well as paved streets without destroying the rubber cushion.

Ask your jobbers for them.

THE HUMANE HORSE SHOE CO. LIMA, OHIO

Phoenix Horse Shoe Co.

Largest Manufacturers of Horse and Mule Shoes in the World.

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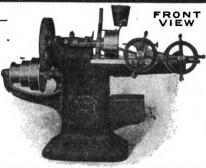
Rolling Mills and Factories, Joliet, Ill., and Poughkeepsie, N. Y.



MERRIMAN

Bolt Threader

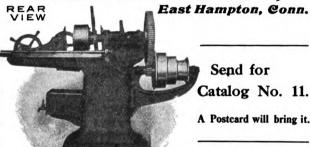
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A Bolt Cutter is Much Like a Man in This THE HEAD IS NEARLY EVERYTHING

The Merriman Bolt Cutter Head is noted for: Simplicity of I ne Ivierriman Bolt Cutter Head is noted for: Simplicity of the Head—only four parts. Great Durability—few repairs needed. Square Bearing of the Dies in the Ring. Solidity of the Dies like a Solid Die. Uniformity of the Product—Bolts all the same size. Effectiveness of Operation—Cheapest help can understand and run it. No machine turns out work more rapidly.

THE H. B. BROWN CO.,



Send for Catalog No. 11.

A Postcard will bring it.

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GASOLINE ENGINE

Built especially for Blacksmiths' Use. 2½, 3½, and 6 H. P.



Look at the other engines first. Note the multitude of rods, springs and triggers described as simple. Remember that the water tank (always left out of the cut) has to be filled and emptied every winter day. To forget it once may mean a ruined engine. Remember that water-cooled engines all have packed cylinder heads. Packing leaks and blows out. Inevitable trouble and loss of power sometime.

trouble and loss of power sometime.

Then look at an engine that IS simple One-piece cylinder—no chance to leak—grows stronger with use. Everything enclosed—no frail parts—no water—not a piece of packing or a gasket in it—no gasoline pump troubles. It absolutely cannot be overheated under full load—any temperature—any length of time. Your judgment tells you to

WRITE FOR CATALOG "K."

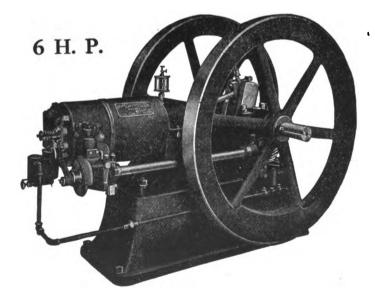
DO IT NOW.

The New-Way Motor Company Lansing. Michean U.S.A.

60 SHERIDAN ST.

GAS AND ENGINE VEBER

THE MOST RELIABLE HELPER IN A SHOP



Thousands of Blacksmiths using and selling WEBER ENGINES.

We have a special proposition to make you on a 6 H. P. Engine.

Buy Direct from Factory with 25 years' Reputation for Quality and Reliability.

Over 20,000 WEBER ENGINES in actual service.

Send for Booklet 103, "How to Buy the Best Engine."

WEBER GAS ENGINE CO. BOX 400 KANSAS CITY, MO. Address.

I. H. C. ENGINES AS Blacksmith's Powers

You are working at a disadvantage if your shop is not equipped with a good reliable power.

You have all kinds of work to do. Power on a good many of the jobs is an absolute necessity.

Consider the matter carefully and you will discover the best of reasons why you should have an I. H. C. gasoline engine in your shop.

With one of these engines installed you will have the satisfaction of knowing you will have power whenever you need it. You will find it better than a line shaft because you do not have to pay for power you do not use. You start your I. H. C. engine going whenever you need power, There is no waiting. Power is delivered instantly. All the power you need will be generated and delivered at the lowest possible cost. And when your work is done you shut off the engine and stop all expense instantly.

An I. H. C. engine will not fail you. They are simple and easy to understand and they are built on right mechanical lines. You have your choice of many sizes and styles of I. H. C. Gasoline Engines:

Verticals—2, 3 and 25-horse power Horizontals (portable and stationary)—in 4, 6, 8, 10, 12, 15 and 20-horse power Air Cooled Engines—in 1 and 2-horse power

It will pay you to investigate these engines. It will interest you to look into their superior materials and the superior way in which they are constructed. International local agents have these engines on sale. Ask them for catalogs of the style you are interested in, or write direct to us.

INTERNATIONAL HARVESTER COMPANY OF AMERICA (INCORPORATED)

13 Harvester Building

CHICAGO, ILL., U. S. A.

AID FOR THE BLACKSMITH

Kerrihard Power Hammer

In the 1989 Model—Kerrihard Power Hammer—is offered by far the best, the most complete power hammer ever offered to the blacksmith trade. This is the concrete result of years of experience in manufacturing power hammers that have met the unanimous endorsement of blacksmiths everywhere. Here is a power hammer correct in every parr, right in its proportions—taking up the minimum floor space consistent with efficiency—right in the metal from which it is east. No scrap—no junk heaps are drawn upon—when the Kerrihard is in the building—not a needless—burdensome fixture attachment. Each part working with every other—removing much of the heavy hand labor of the smithy, and transferring it to the hammer. That shop dependent upon hand-labor at the present day—when the Blacksmith's Best Friend—the Kerrihard Power Hammer is offered—is doomed to trail behind—instead of forging ahead.

For—this hammer—is not only the best on the market—but 'tis also sold at a price which removes all objections from the standpoint of expense. And—the terms—are a sure evidence that the Kerrihard Hammer—must perform—according to promise—else your trial costs nothing.



Each Kerrihard Power Hammer—is sold under a Ten Days' Approval Test. No cost to you—if this hammer fails to do as we claim—or is in any manner unsatisfactory. We leave it to you—to determine its utility—its money-saving value.

Price \$60 -you save \$25 to \$50. This close price is the result of modern system in factory production. Not to be matched in quality—nor to be approached in Price, is the moto that's responsible for the enormous sale of Kerrihard Hammers. You save \$25 to \$50—under our plan—and secure the greatest value for your money.

Consider—all these—the Matchless Utility Value, the Embodiment of the Latest Improvements,—the Approval Test—the Low Price—then write Kerrihard for Specific Information and Descriptive Literature.

Literature.

A single day's delay means a loss to you—Today's action means—a step forward toward easing your physical labors and increasing your Bank account.

Will You-Do This-Just Now-Do Write



COMBINATION SAW and GRINDER

POWER HAMMER Hammer and Grinder Dept.

Red Oak, Iowa, THE KERRIHARD COMPANY.

вотн-

EVEN AND OVER-SIZE THREADS

cut with each

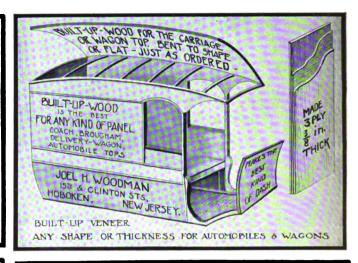
set of dies

That is one thing that can be done with a "Duplex Die Stock. Learn of the further points of difference between it and others.

THE HART MFG. CO.

50 Wood Street

CLEVELAND, O., U. S. A.



T. E. McCOOK PRACTICAL HORSESHOEING GENER

GENERAL BLACKSMITHING

Riceville, Iowa, mar. 6th 1909

Buffals Forge 6.
Gentlemen:
The Buffals portable
... 9 Lough

down draft Forge no. 660 9 fought from you a year ago is a dandy. The blower runs easier and quieter than any I have ever used and gues a stronger blast capable of the heaviest work

See ads on pages 35 and 47.

18 ne 6004



Say! Mr. Blacksmith,

have you heard about the new tire setter called

THE SCIENTIFIC

Blacksmiths are just wild about it where it is used, and the manufacturers are either crazy or dead sure they have a "cinch" on the other fellows for they actually warrant it to be better than any other and will let you be the judge.

GET ONE QUICK IF YOU WANT TO KNOCK OUT YOUR COMPETITORS.

Write for information at once to

National Hydraulic Tire Setter Co.

KEOKUK, IOWA.





on tires of ordi-nary size, and will not in-jure the wheel. It saves cut-ting and re-welding tire. This heater is perfectly constructed and is pracand is prac-tically inde-structible. Write at once for description and

ROCHESTER TIRE HEATER CO., Rochester, N. Y.



Our Taps and Dies are the best that 34 years' experience and up-to-date methods can make them. The easiest cutting and longest wearing screw cutting tools made. Send for free catalog.

A. J. SMART MFG. CO., Greenfield, Mass.

HAY - BUDDEN SOLID WROUGHT IRST MADE IN AMERICA

The Gold Medal Anvil HIGHEST AWARD

OMAHA, 1898 PAN-AMERICAN, 1901

Every genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with the best Crucible Cast Steel. Every genuine "Hay-Budden" Anvil is made by the latest improved methods. the latest improved methods



ANVILS

Over 150,000 in Use WARRANTED

WEIGHTS FROM 10 to 800 LBS.

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO., BROOKLYN, N.Y. **BUFFALO**

N.Y. U.S. A.

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AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

AUGUST, 1909

\$1.00 A YEAR 10c A COPY

WE ISSUE

"SEASONABLE OFFERINGS"

and other catalogs of value in which we print in the Boldest type our prices with a uniform discount applying, so a glance will tell you just what an article costs. Knowing that our prices are always right, we submit them for your approval.

If you do not receive these catalogs, your name is not on our mailing list. Remedy this by dropping us a post card, stating name, address, business, and request to receive our valuable catalogs.

We want every blacksmith, woodworker, machinist and buyer of heavy hardware to receive our printed matter so he can get acquainted with the best, up-to-date, alive Blacksmith Supply House in the world. Write now.

You are invited to attend and make our store your headquarters during St. Louis Centennial Week, Oct. 3---9, 1909.

BECK & CORBITT IRON COMPANY ST. LOUIS, MO.

Silver's Band Saws Are Sterling Actors.

Silver's Band Saws are "Sterling actors that look the part." Patterns all new, with labor-saving features never before dreamed of—patented, of course.

While every part is worthy of mention, we will only refer to the special time- and labor-saving features in the recent improvements. They include:

A new frame design, handsome in appearance, that rests on the floor on all sides, thus giving added strength and solidity and insuring cleanliness around the machine.

A new patented device for the table for angle sawing. A turn of a hand wheel loosens or rigidly fastens the table at any desired angle up to 45°.

A new belt shifter that can be used either above or below pulleys, making the shift a certainty no matter from what direction power is applied.

Instead of being low-down under the table, the shifter is now within easy reach of the operator's left hand and can be instantly fastened where desired by a turn of a thumbscrew.

The position of the upper wheel adjustment has been changed, so that the operator can conveniently reach same while at work.

The Foot Power Machines illustrated are fresh from our designers.

The simple, direct, planetary motion utilizes every ounce of power generated. Nothing to get out of order. Send for new circular.

New Saw Tables and Swing Saws now ready. Circulars on request.

Our 1909 Machinery Catalog covers, in addition, our line of Forges, Post and Power Drills, Hub Boring and Spoke Tenoning Machines, as well as Band Saws and Jointers. Send for it.

The Silver Mfg. Co., 365 Broadway,

Salem, Ohio.



Fig. 721. 20 Inch (new)

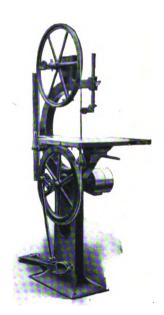


Fig. 722. 20 Inch (new)

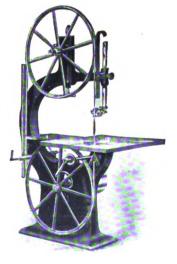
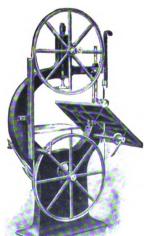


Fig. 824. 36 Inch



Fig, 822. 32 Inch

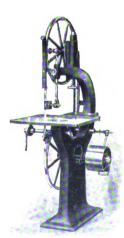
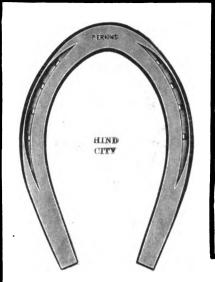
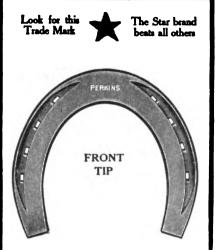


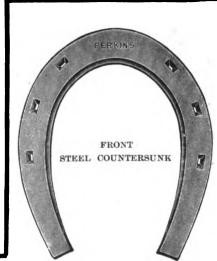
Fig. 820. 26 Inch



Fig. 720. 20 Inch







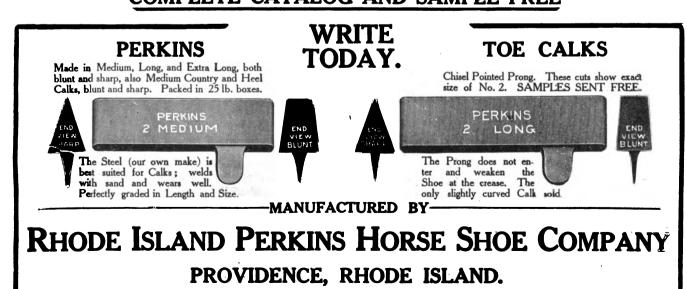


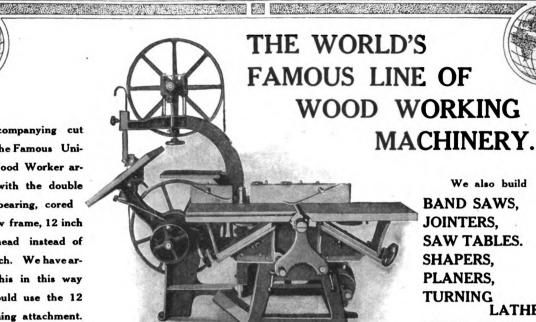
★PERKINS★ HORSE SHOES TOE CALKS The SUPERIOR Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send COMPLETE CATALOG AND SAMPLE FREE





We also build BAND SAWS. JOINTERS. SAW TABLES. SHAPERS, PLANERS. TURNING LATHES. SWING SAWS, POST BORERS.

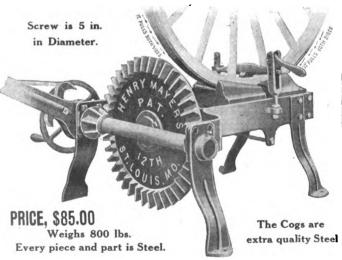
SIDNEY TOOL CO., Sidney, Ohio, U. S. A.

You are a Mechanic. WILL YOU DO THIS? Please compare the cut of

MAYERS COLD TIRE SETTER

with all others. You can see at a glance how it works and understand it. No fixings, ginger bread or banjo work to adjustor break. The MAYERS is as simple, as good, as solid, as powerful and as durable as it looks. About twice as heavy as other machines and every piece and part warranted steel. Both heads (right and left) are on a 5" screw and REALLY do what others PALSELY claim: PULLS BOTH SIDES. While others do set tires and satisfy some people, and they honestly indorse them, yet that does not disprove that the MAYERS is in a class all by itself for QUALITY of work. We will prove it. Are YOU afraid of your own JUDGMENT? We are not. Will YOU believe YOUR own eyes? No matter what your OPINION is NOW, a trial of this machine will convince you that it does set tires PERFECTLY, because it has the RIGHT PRINCIPLE, drawing both sides at the same

time. The trial will convince you. The price is about one half of the others. The terms are easy. The guarantee is ironclad. What more could a PARTICULAR, careful man want?



The accompanying cut

shows the Famous Universal Wood Worker ar-

ranged with the double

outside bearing, cored

band saw frame, 12 inch

jointer head instead of

the 10 inch. We have ar-

ranged this in this way

so we could use the 12

inch planing attachment.

Get our Prices at once!

We have added a

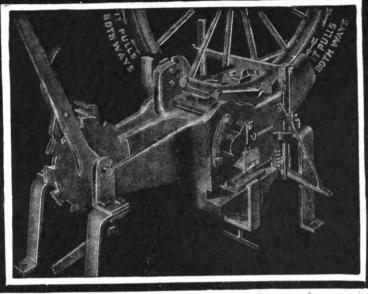
JOBBING DEPARTMENT

to our business and are prepared to quote you prices on all kinds of TOOLS and MACHINERY. Our terms as to Payments will Interest you and it will pay you to write us and get our Plan.

MAYERS TIRE SETTER MFG. CO., 4028-4030 Forest Park Boulevard, St. Louis, Mo. P. S. WE MAKE A DISHER that YOU NEED. Write for cut of it.



NOT ONLY THE BEST



BUT ALSO THE CHEAPEST

EXTEND YOUR TRADE, INCREASE YOUR PROFITS, INSTALL A HOUSE COLD TIRE SETTER IN YOUR SHOP NOW.

The HOUSE is the one to buy, and don't be deceived by big sounding ads, for some men have no regard for truth, and besides, if required, you can try ours in your shop at our expense, though your neighbor likely has one, for there are about 3,000 in use. This is the real proof, also, that ours are the best, for if others are as good they would have as many in use. They certainly advertise the biggest.

The following evidence shows why men buy ours:

Waco, Texas, Feb. 4th, 1909.

The House Cold Tire Setter is a Money Maker—Before I bought one seven years ago, I.

The House Cold Tire Setter is a Money Maker—Before I bought one seven years ago, I.

Set you have built a good two-story brick shop. The House Cold Tire Setter is responsible for it all. It has certainly kept the clear dollars dropping into my pocket.

A. B. GARBER.

Bedford, Pa.

They Never Wear Out—I have used my House Cold Tire Setter constantly for 7 years. has never been out of fix, nor cost me one cent for repairs and I would not sell it for price if I could not get another.

F. H. BRIGHTBILL.

Dallas, Tex., Dec. 1, 1907.

The House Cold Tire Setter is a Trade Getter—I bought one in 1904, prior to that time I had very little work, but after that I had worlds of it—for instance, I set 4,000 tires the second year and I got their other work, too, don't you forget it. I have set 117 tires in one day.

L. D. BUSBY.

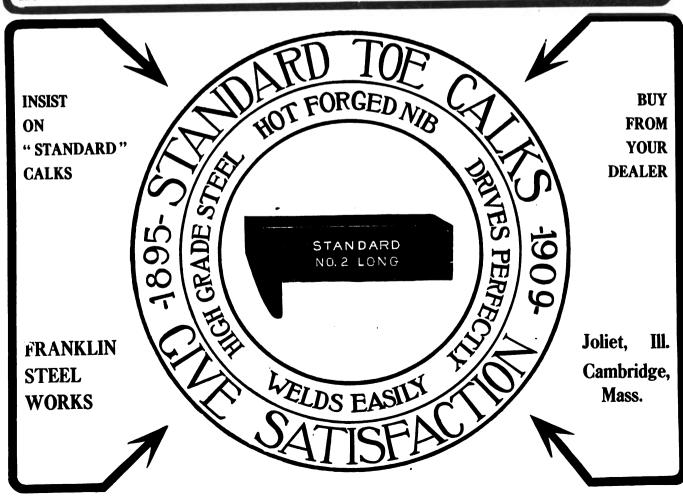
Ft. Sam Houston, Tex.

See What Uncle Sam Says—The No. 3 House Cold Tire Setter which the Government bought in 1907 does all our work with ease. It is at once a great time and labor saver.

D. W. KILBURN, Captain and Q. M. 26th Infantry.

We have good evidence to show that the Government has not bought nor put in any cold tire setter but ours within the last three years, there-fore, any claim to the contrary is unfair and misleading. The real season is on now the 7 wet years are past and the 7 tire setting years are here, so there is no time to lose. Write us at once,

HOUSE COLD TIRE SETTER CO., 216-218 S. Third Street, St. Louis, Mo. J. F. HOUSE, 201 Church St. Toronto, Ont., Canada.



"CHICAGO" EMERY WHEELS CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.



"CHICAGO"
WHEELS SAVE TIME

They're made of stuff that cuts

Emery Wheels, Glue, Emery, Pel-Johing Wheels, Grinding Mechinery 135 Page Catalogue for the Action

Chicago Meet & Mg Car 41 SO. ABERDEEN ST. CHICAGO, U. S. A. c

"QUICK ACTION" IGNITING DYNAMOS Excel all others?

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils, Send for Catalogue B.

The Knoblock-Heideman Mfg. Co., SOUTH BEND, IND.

The White Lily Gasoline Engine

is now made h

THE DAVENPORT ICE CLIPPING MACHINE CO.

1575 West Third St., Davenport, Ia.

Ask for Special Offer and Free Catalog

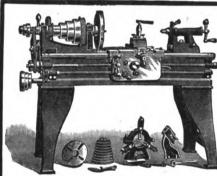
GOOD RULES TO GO BY

BLACKSMITHS' HOOK AND HANDLE RULES

Made from hard rolled sheet brass, one-tenth inch thick, one and one-sixteenth inch wide, with heavy gradations and figures, graduated from the end in sixteenths of an inch on one side and from the inside of the hook in sixteenths of an inch on the other, adapting them for taking correct measurements from either the outside edge of a hot piece of iron, or from the inside when held against a corner. Graduated twelve inches, have flat handles and measure over all sixteen and three-fourths inches.

Price, postpaid, \$1.15. Catalog No. 17 AH of fine Tools free.

The L. S. STARRETT CO., ATHOL, MASS.



Built For Business

Our new 15-inch engine lathe, with all time and labor-saving improvements, heavy and substantial, a modern, practical, high-grade lathe, is the best for your shop.

It's a SEBASTIAN—a good lathe Investigate its merits—Write for Catalog.

Foot and Power Lathes, 9 to 15 in. Swing

SEBASTIAN LATHE CO.

124-126 Culvert St., CINCINNATI, OHIO



Will turn off blue chips on any kind of work.

Firth-Sterling Steel Co.

McKEESPORT, PA.

Selling Agencies

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SCOTT'S CRUCIBLE TOOL STEELS

Made in all grades Fully guaranteed All sizes in stock

THE
BOURNE-FULLER CO
IRON STEEL
PIG IRON
COKE

Cleveland, Ohio

BROOKS COLD TIRE SETTER IS GUARANTEED

A guarantee that insures you of the best tire setter made, perfect results—more trade and a larger income. We are specialists in building Brooks Cold Tire Setters. We put the best quality of material in our machines. Construction and workmanship is of the highest and most superior kind. So we are able to give a positive and strong guarantee. Furthermore the Brooks is endorsed and in use by the United States Government. Also thousands of Blacks smiths and Wagon-makers are using Brooks Cold Tire Setters and are getting splendid results. Read the letters below. If the Brooks brings them trade, builds up their business and increases their incomes, will it not do the same for you? Don't put this off. Act now.

SET 3.000 TIRES IN 7 MONTHS ON THE BROOKS

Sunbury, Ohio, June-24, 1909.

The Brooks Tire Machine (°O:
Dear Sirs:—In March, 1908, I bought one of your No. 4
cold tire setters. Up to November 1, 1908, I set 8,000 tires
from % inch wide x % inch thick to 4 inches wide x 3/4
inch thick. It gives me the best of satisfaction. I would
think as much of doing without my forge as without the
Brooks Cold Tire Setter. Yours truly, W. S. PATRICK.

SET 50 TIRES IN 8 HOURS ALONE, ON THE BROOKS

Friendship, N. Y., June 28, 1909

Friendship, N. Y., June 28, 1909.
The Brooks Tire Machine Co.:
Dear Sirs:—In regard to my Brooks Cold Tire Setter, I have set about 9,000 tires on this machine. I set 8,700 last year. Have set 50 tires in 8 hours alone. Have never had one cent of expense on same. I would not run shop one minute without it.

Yours truly, E. J. HART.

EASY TO SET 60 TO 70 TIRES IN HALF A DAY ON THE BROOKS

Dawson, Ga., June 22, 1909.

Dawson, Ga., June 22, 1909.

The Brooks Tire Machine Co.:
Gentlemen:—We have the best cold tire setter in the world.
Had no idea you turned out such a good machine. Thousands of tires shrunk by us on the Brooks hardly starts to tell its benefits. We have been using this machine for six or seven years and it has never cost us but \$10 or \$12 for repairs and is worth today within \$5 of its first cost. We got the machine in our shop on the 8th day of June and shrank 1.788 tires before the winter rains that year, 60 to 70 in half a day is an easy thing. From 8 to 12 minutes is all the time we want to shrink the whole set. We can't say half as much as the Brooks is entitled to.

Yours truly, W. P. HOLMAN & SONS.

Send for illustrated catalog and vest pocket memo-randum book. FREE TO YOU.



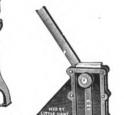
COMPANY. MACHINE BROOKS TIRE THE

855-857 Ellicott Square, BUFFALO, N. Y.

Write to nearest office

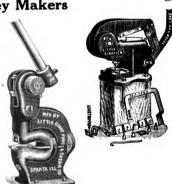
121 North Water Street, WICHITA, KANSAS.

LITTLE GIANT HAND PUNCH AND SHEARS All Money Makers All Labor Savers 8 STYLES



A COMPLETE LINE





It will pay you to get our printed matter and prices. CAN MAKE PROMPT SHIPMENTS.



Punches thicker iron, less power, less space, is lighter than any portable lever punch made. By removing handles; it is of a convenient size for satchel or tool chest Punches and dies made interchangeable.

Sold by all the leading jobbers.

WRITE FOR COMPLETE CATALOGUE AND PRICES.

LITTLE GIANT PUNCH & SHEAR CO.

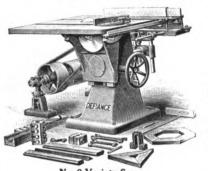
210 South Market Street,

SPARTA, ILL.





THE DEFIANCE
MACHINE WORKS
DEFIANCE, OHIO



Wagons, Carriages, Automobiles,
Hubs, Spokes, Wheels, Rims,
Shafts, Poles, Neck-Yokes,
Single Trees, Hoops, Handles of all kinds,
Spools, Bobbins, Insulator Pins,
Shoe Lasts. Table Legs, Balusters,
Oval Wood Dishes & General Wood-Work.

FOR MAKING

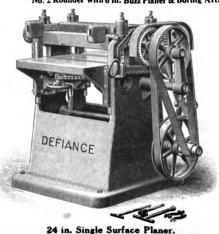


No. 2 Rounder with 6 in. Buzz Planer & Boring Attach.









No. 6 Vertical Borer.

No. 1 Post Borer.

28 in. Band Saw.

Eccles Ball Bearing Couplings

ALL OUR COUPLINGS ARE SHIPPED OUT WITH TWO-PIECE BUSHINGS FASTENED IN THE COUPLINGS

When Bushings are worn out by long use they can be instantly replaced and fastened into the socket by our special process.





Patented Nov. 25, 1902 Patented June 11, 1907 The spring is pivoted at the front so that it can be turned out of the way of the wrench while clipping Coupling to the axle.

NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS

Catalog No. 15 is our Latest

We make a full line of Carriage and Wagon Forgings

RICHARD ECCLES COMPANY, Auburn, N.Y.

What Experts Say of "Capewell" Horseshoe Nails

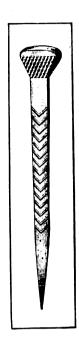


F. I. Goodwin, shoer of "Allen Winter," winner of the \$50,000 handicap, trotted at Readville, Mass., August 25, 1908, says:

"For hard and trying service like horse racing, the 'Capewell' is the only nail you can pin your faith to."

Fred Kope, shoer of "The Eel," "Copa de Ore," "Barron Gratton," and other noted ones, says:

"I use 'Capewell' nails on all horses I shoe-have used them for years—and I find other shoers on the Grand Circuit are using 'Capewell' nails have no equal.''



These are two of many testimonials from eminent shoers, and we have countless similar expressions from the "rank and file" throughout the country.

THE CAPEWELL HORSE NAIL CO. HARTFORD. CONN.

BRANCHES.

ST. LOUIS **CHICAGO NEW YORK** PORTLAND, ORE. CINCINNATI DETROIT PHILADELPHIA DENVER **BOSTON** YOKOHAMA, Japan SAN FRANCISCO **NEW ORLEANS** TORONTO, Canada MEXICO CITY, Mexico

The Largest Manufacturers of Horseshoe Nails in the World.

Build a GASOLINE MOTOR or Motor-Cycle



Bicycle, Anto, Marino or Stationary. Send stamp for

Selle Gears

All Styles and Sizes

THE AKRON-SELLE CO.

LAFFITTE

Do You Make Your Blacksmith Shop Pay

THE PHILLIPS-LAFFITTE CO. PHILADELPHIA, PA.

AKRON, O.

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WELDING

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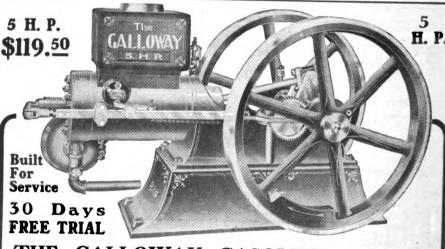
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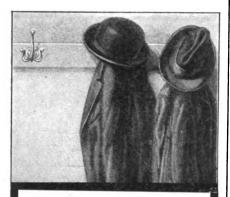
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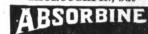


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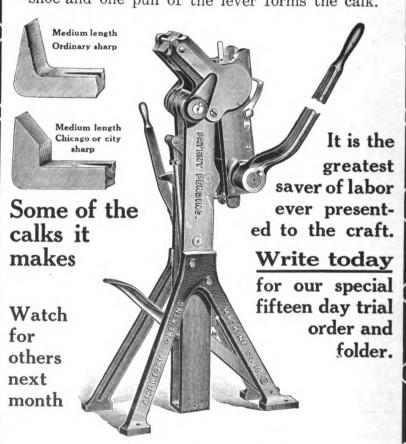
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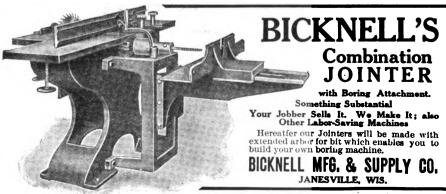
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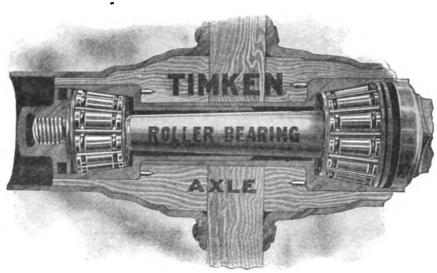
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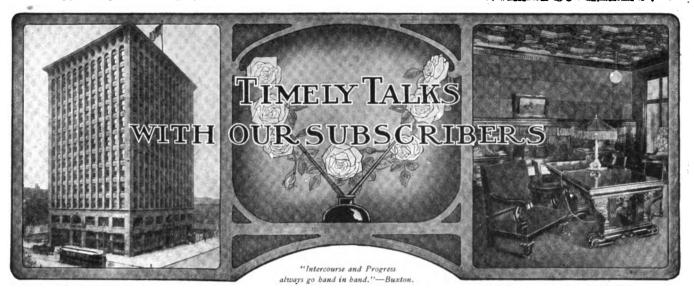
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Walter O. Bernhardt, Editor.

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Say "Hullo," an' "How d'ye do? How's the world a-usin' you? Slap the fellow on the back, Bring yer han' down with a whack! Waltz right up, an' don't go slow, Grin an' shake an' say "Hullo!"

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Say "Hullo," an' "How d'ye do?" Other folks are good as you. W'en ye leave yer house of clay, Wanderin' in the Far-Away, W'en you travel through the strange Country t'other side the range, Then the souls you've cheered will know

Who ye be, an' say "Hullo!"

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Since the inauguration of our automobile department considerably over a year ago many of "Our Folks" have taken up automobile work. Of course, some of you have been called upon to do some difficult jobs-jobs that have taxed your inventive ability. We want you to tell us about them. We want an article from you telling how you take care of automobile work-how you solve the puzzling problems and the difficult repair jobs. We want you to tell us the story in your own way-to tell it to us as you would to your own neighbor. If necessary make a pencil sketch or two or as many as necessary to bring out your ideas. Never mind about the sketches being rough—we don't expect you to give us an artist's draft. Will you let us have something from you at an early date? The automobile is here to stayis getting more and more popular, and although it will be a long time before it displaces the horse "Our Folks" will make no mistake in taking up this work. If you have already taken up automobile repairing let us have an article for publication from you. We'll see that it appears in proper style. Won't you write now?





Power-Hammer Tools

G. R. PARTRIDGE

work steady and firm. In Fig. 1, at A, is shown two styles of tongs; either of these when fitted to the work will hold it firmly and keep it from slipping sideways. In place of the ordinary link for slipping over the handles of tongs the special link, as shown at B, is made. The projections on this link enable the operator to turn his stock easily and quickly under the hammer.

The cutting tools for use under the

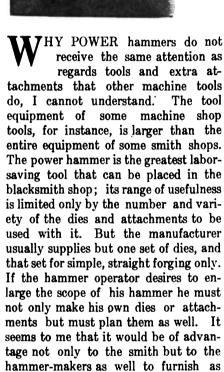
power hammer are somewhat different in shape from hand tools or those used in the regular way. This change in shape is made necessary on account of the heavy blows struck by the power hammer. The handles of cutters should be metal and not wood, and if the handle is shaped as shown it is not so liable to break or to vibrate in the hand when the blow is struck. The tool at C is, of course, a hot cutter. The cold cutter, or nicker, is heavier and bulkier to withstand the crushing between a heavy ram and solid, cold metal. A cold cutter is shown at D. Many smiths use old three-corner files for

a flexible handle to prevent breakage.

In order to work tapered material

under the power hammer a special tool, such as shown at E, is required. This is used with the curved side presented to the work when drawing out and with the flat side on the work when finishing. By using this tool tapered work may be manipulated without special dies, as the flat, parallel faces of the anvil and ram could not, of course, be used satisfactorily on tapered or slanting surfaces.

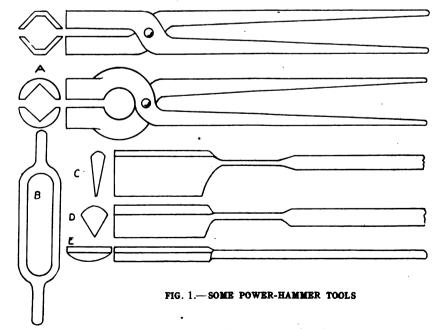
Swages for use under the power hammer should be planned according to the work to be done. In Fig. 2 is a swage for general work. This one is made in two parts and the spring then riveted together, as shown. It is much easier to forge it in this way than to



Now, as to the tools that will be found useful and practical in connection with the power hammer—they depend in large part upon the class of work done in the shop. There are, of course, some tools that can be used by all power-hammer operators. These we will attempt to describe and picture, while the ones for special work will be touched upon to set the reader to thinking, planning and to making dies to suit his own class of work.

complete a set of dies and tools as possible for the money. It would naturally make the hammer more useful and would consequently increase its sale.

The tongs with which to handle work under the hammer are, of course, of first importance. They should not be ordinary flat-lipped tongs, such as are generally used by the average smith. They should be made especially for power-hammer work—made to hold the



cutting and nicking under the power hammer. When used for this purpose take but a section of the file and use it in connection with have the spring in one piece, as at B. In making the swage at A the lower part is made to fit the bottom dies of the hammer very snugly. The top part

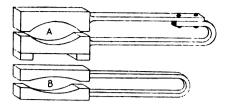


FIG. 2.—FOR GENERAL USE UNDER THE HAMMER

is made to correspond to the face of the lower part and then a piece of flat spring steel is welded to each part and then riveted as shown. This swage is for finishing up work under the power hammer.

When a considerable number of pieces of the same size and shape are to be made the smith will save much time and hard work by drop-forging them or bending them under the hammer. Of course, the cost of the dies must be considered when figuring on doing work in this style. If the pieces can be forged easily by hand and there are not sufficient to pay for the making of special dies it would be folly to go to the trouble and expense of forging special dies. Let us take for example the forging of a number of rods, with eves on the end, as at Fig. 3, A. Suppose a quantity of these to be required by a contractor. We make one by forging it by hand and finishing and filing to size. This may be submitted to the customer for approval before making the dies. After being approved, take a block of machine steel and after heating it carefully and thoroughly lay it under the power hammer, place the eye rod upon it and drive the rod and eye down into the block for half the rod's thickness. Proceed in like manner in making the upper die and then true the dies so they will work together perfectly, as shown at B, Fig. 3. Now insert pins, XX, at C, and drill holes to correspond, so that the dies will come together properly. These dies

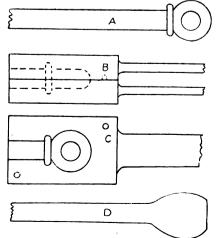


FIG. 3. SPECIAL DIES FOR SPECIAL WORK

may be fitted with a spring or may be fitted with handle rods and left separate, if a helper is used at the hammer. In forging eye bars or rods in this way several rods are placed in the fire to heat. As fast as they come to the proper heat the ends are upset, as at D, Fig. 3, again heated if necessary and then placed in the dies. If a man is quick he can take the heated rod, jump it on the anvil to upset it and place it between the dies, all in one heat.

As an example of bending duplicate work let us suppose that we require a considerable number of knees or supports for barn door tracks. These knees are shaped as shown at A, Fig. 4. We make one knee by hand, as a pattern, making it just the size and dimensions that we require the other knees to be. We then take a piece of steel and shape it to fit into the knee at M. This piece is then fastened to a block, N, by means of bolts, as shown by dotted lines. The top die is shaped as shown at B; this die may be made by cutting out the

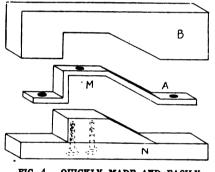
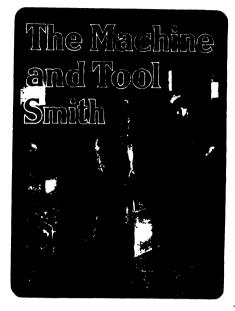


FIG. 4.—QUICKLY MADE AND EASILY WITH FORMERS

piece with a hot cutter and then shaping it to the pattern forging. In use, heat your flat stock, lay it on the lower die in proper position and bring the top die down easily at first and then with two or three heavy blows. You can turn out several track knees in this manner in less time than it would take to make one bend by hand.

The opportunities for the making of small specialties with the power hammer is something that the smith cannot well overlook. There are without doubt many little items required by customers of the general shop that can be quickly and cheaply made in quantity under the power hammer and sold at a good profit. After the dies have been made the item of cost for material and fuel is generally very small. Of course, the smith must know his business, know how best to make his dies and know costs, so as to tell how big an order he must have to make a profit and pay for the dies. Simple dies are, of course,

quickly paid for, and in some instances dies may be profitably employed on small orders of duplicate parts, if the dies are not complicated.



In hardening tools never attempt to use clear water if the best results are desired. A salt bath should always be used and the salt should be thoroughly dissolved. This will insure perfect results, other things being equal.

HARDENER, Illinois.

To break large bars under the steam hammer, nick around the bar and then place the piece on two small round pieces of stock on the hammer anvil. Place another piece of stock on top of the stock to be broken, and right over the nicked line. The pieces upon which the bar rests should be one on either side of the nick. Now bring the ram down good and stiff.

M. F. S., Rhode Island.

Frogs and Crossings.

THOMAS F. KEANE.

The blacksmith shop in our works does not manufacture the completed switches and crossings, but only the necessary forgings, and, therefore, my knowledge on this subject is somewhat limited.

There are many accidents from split switches; but if one considers how many split switches are in service, the proportion of those causing trouble seems very small. The most fruitful cause of trouble with point switches has been from a desire to economize in slide plates, both in the number of plates and in making the plates of too cheap construction. Originally, the plates were put under the switch only on the few ties at the point where the side of head of rail is planed away, leaving the heel end of the switch resting on the ties. The heel end of the main track switch rail, when not supported by plates, will

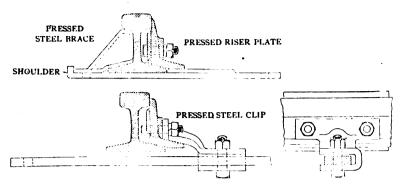


FIG. 1.—SPECIAL REINFORCED SWITCH

naturally cut in the tie and soon become much lower than the stock rail, and a train trailing through the switch, particularly with a grooved-tire d wheel, under these conditions is likely to strike the turnout rail on the side and force it out, instead of riding over on top of it as it should. To overcome this, different methods of elevating the switch rail by vertical bends have been tried; but the surest way is to put a heavy plate on each tie under the length of the switch. The pressed steel riser plate, very commonly used, is not at all satisfactory. If these plates are made of one-inch stock, with a 1-inch riser pressed up, the plates must be more than half cut in two right at the vital point at the base of the stock rail. Many standards call for this riser to be 3-inch high, and some roads use plates only \display-inch thick, so, with the plate nearly cut in two at the edge of the stock rail, it is not surprising that they buckle and break in service, thereby causing trouble. These plates are shown in Fig. 1.

The market is open for an economical design of plate which will overcome this difficulty. The Central Railway of New Jersey and some other roads use plates drawn from 1^98 , $\frac{8}{8}$ and $\frac{3}{4}$ -inch thick out to $\frac{1}{2}$ inch thick, where the stock rail rests. This makes a very strong and effective riser plate; but the cost is very considerably higher than the pressed steel plate. Unfortunately for the blacksmith, our people have found the most economical heavy riser plate

We plane a seat out of the 3-inch section for the stock rail and brace, leaving a positive stop with a square shoulder on both sides of the stock rail to hold it to gauge, as shown in Fig. 3. With this plate a switch with a level base throughout its entire length is recommended and the elevation run off in the lead

have done this as yet. It is rather a surprising fact that there are fewer breakages with switch rails that are weakened by being planed away than in the main track. Still, a breakage of a switch point would be much more serious on account of not being spiked, than with main track rail if it were not for the reinforcing bars.

Two rods are universally standard on 15-foot switch rails. There are many types of adjustable rods which make quite a little work for the blacksmith, but we advocate using switch rods and making the adjustments in the moving rods and in the switch stands, with which adjustments all lost motion resulting from wear or other cause can be most readily taken up and both points can be adjusted to fit the stock rail. One objection in having the switch tie bars adjustable is that frequently the

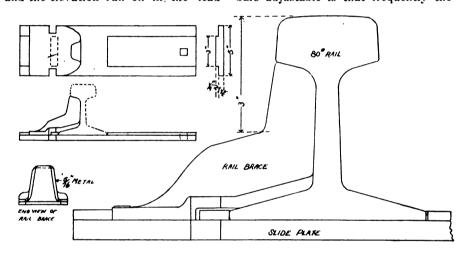


FIG. 2.—SOLID ROLLED SWITCH SLIDE AND MALLEABLE IRON BRACE

rails. A switch with a level base is of considerable advantage in assuring a uniform bearing on the ties, and you do not see the switch rail working up and down as much under every pair of wheels as with a switch rail with vertical bends, under which it is almost impossible to place the ties and keep them correctly for uniform bearing.

The reinforced 15-foot switch is the most popular now; but on account of

trackmen in making adjustments will adjust only one rod, leaving the points out of line.

There are various styles of switch clips for holding the switch tie bars. We have for many years furnished a style of clip and rod with a long jaw formed by jumping on a short piece and folding over. But we now have more call for the pressed steel side jaw clip, made from one piece of metal, and

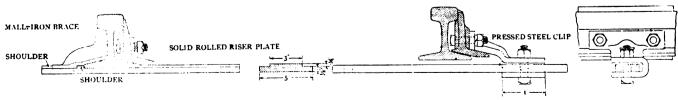


FIG. 3.—ANOTHER STYLE OF REINFORCED SWITCH

to be a special rolled section, 5 inches wide by $\frac{3}{4}$ -inch thick for three inches in the middle and $\frac{1}{2}$ -inch thick for the balance of the plate. This plate is shown in the engraving in Fig. 2.

the rails being rolled in 33-foot lengths there is a good deal of talk of adopting 16½-foot lengths, so that the points will cut economically without waste. But there have not been many roads that

we furnish these clips with jaws made 4 inches long, as shown in Fig. 3.

In Fig. 4 is shown plan and sections of a spring rail frog. This is an economical frog to build and is the standard frog

used by the Interurban Railway Transit Company, of New York City, both in its subway and elevated tracks, and also as standard on many of the Trunk Line center frog is the thing. In the rigid frogs there is very little work for the blacksmith, as the rails are cut in the machine shop with the planer, slotters, short radius then, of course, a continuous guard rail is necessary.

For angles above 30° a three-rail type of crossing is advisable. Between 25°

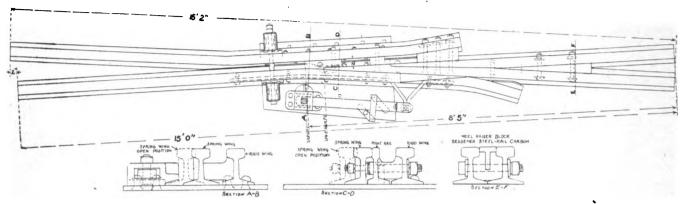


FIG. 4.—SHOWING PLANS AND SECTIONS OF SPRING RAIL FROG

roads, including New York, New Haven & Hartford. Some of the roads have adopted certain modifications, such as additional tie plates, which while they

etc., and the Manganese centers cast or ground to a smooth finish.

The style of construction of crossings depends to a large extent on the angle.

and 40° we make the three-rail crossing, with miter points, such as shown in Figs. 6 and 7. The difference between these two plans is that the former is equipped

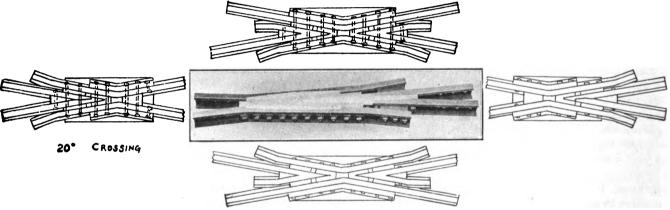
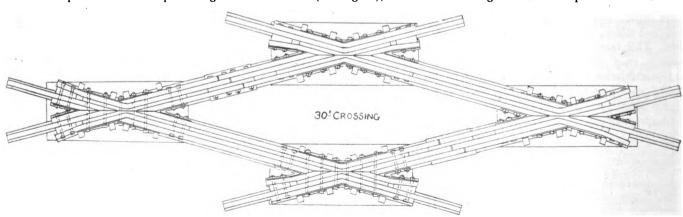


FIG. 5. SINGLE-RAIL BOLTED PLATE CROSSING WITH EASERS, ALSO A MANGANESE HARD CENTER FROG

add slightly to the cost are a very good feature.

In regard to rigid frogs made of Bessemer rail we prefer the bolted plate frog For angles up to 30° and track on tangent, a single ra l-bolted plate crossing with easer or reinforcing rails is as good as can be had (see Fig. 5), unless the

with cast-iron filling blocks which fit the web of the rail very accurately; the other style is equipped with rolled steel filling blocks which possess the advan-



FIGS. 6 AND 7.—THREE-RAIL BOLTED PLATE CROSSING WITH ROLLED STEEL THROAT-BLOCKS

with plate large enough to cover two ties under the point of the frog, and a tie plate on the next tie on either side; however, where the service is hard, such as at terminals, the Manganese steel service is sufficient to warrant putting in a crossing with Manganese centers. In Fig. 5 is also shown a photographic view of the Manganese hard center frog. If the tracks are surved to a tage of being continuous through the frog centers; but it is impossible to get as good fit with the rolled steel blocks where there are irregular fits to be made, as with the cast blocks.

For angles above 40° we make the three-rail type of crossing, what is termed butt-joint—the rails in one track being continuous and the rails in the other track butting against same, as shown in Figs. 8 and 9. In these crossings the filling is rolled steel, as the flangeways are straight and there is no special fitting, except where the rails butt. These crossings are all equipped with heavy forged reinforcing straps, or knees, bolted in the corners, and are held to plates preferably by clips passing over the base of rail and secured to plate by bolts.

These plans, of course, all apply to heavy section of rail, such as 100 pound down to 60 or 50 pound. With the light rail sections, such as 30 pound, etc., we make the frogs and crossings riveted plate type, such as shown in Fig. 10. The leverage on the heavy rails, due to their height, is so great that the rails can not be held securely to plates by rivets only and the filling blocks in the flangeways with bolts are necessary.

Repairing Locomotive Frames.

G. BOLLINGER.

The most noticeable departure from common practice in frame work is the repairing of frames without removing from the locomotive. A remarkable feature of this is the fact that since this form of repairs was inaugurated at Altoona out of 881 frames welded we have experienced less than a dozen failures. The subject at that time was one of considerable complexity, but we have now passed the experimental stage and all frames around which a furnace can be built can be repaired without removing the frame from the locomotive.

From our experience we are led to believe that repairing of frames in this manner is a decided success, and in most cases the frames have proved to be as serviceable as those repaired in the shop. The fact that we have repaired almost 900 frames in three years, without removing the frames from the locomotive, shows that this method is used very extensively at Altoona Machine Shops.

The repairing of frames is a work that requires considerable study and it is very necessary to exercise good judgment in order to determine which part should be repaired and which part should be scrapped. A special effort should be made to repair frames as economically as possible, but what may appear to be a very economical job by using the old parts may prove to be a very expensive one. Old parts should

never be used where their use will detract from the value of the frame. We were recently asked if we could change frame-maker and proceeded to make the change in the following manner:

Both lugs were cut off at the back

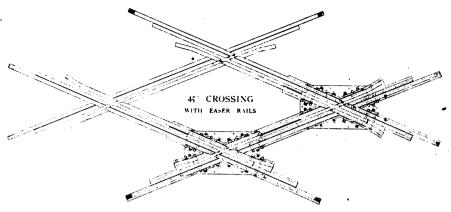


FIG. 8.—A THREE-RAIL BUTT-JOINT CROSSING

ten H-6 steel front end frames from right to left. These had accumulated in stock on account of the demand for left frames being greater at that time, holes; pieces were welded on the beveled edges on one side and the square edge of the opposite side was cut to a beveled web. The center of the web or

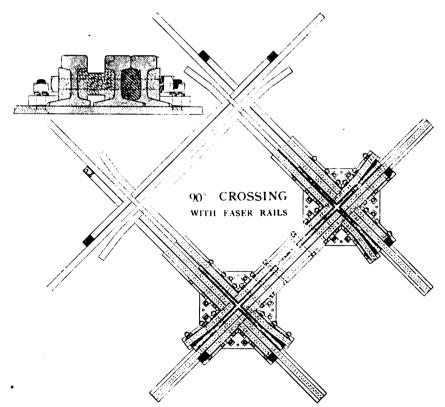


FIG. 9.—THE FILLING IS ROLLED STEEL, AS THE FLANGES ARE STRAIGHT

and in order to dispose of the frames it was decided to make this change. This appeared to be a difficult operation, but we assigned the work to a competent

rib was filled up and changed to the opposite side and after sufficient metal was put on the beveled edge the lugs were welded on in the regular way. This

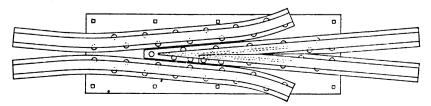
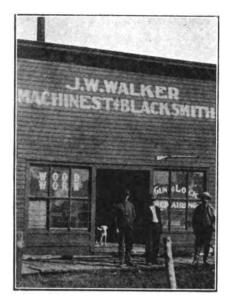


FIG. 10.—RIVETED PLATE TYPE FROG



A GENERAL SHOP OF OKLAHOMA

was an inexpensive operation, the frames giving good service and costing much less than a new front end.

We have also repaired steel front end frames. This was done by forging a piece of wrought iron about the size of the piece broken off, and after a small wrought-iron piece was welded to the steel parts to insure a better weld the new forged section was welded on, it being held firmly in place by a clamp and a V weld made. All frame repairs should be made neatly, quickly, economically, without detracting from the value of the frame, and repairs in this way will prove generally satisfactory.

Forging Rings.

DAYTON O. SHAW.

The machine blacksmith often has orders to make rings and these orders in my experience come in various forms, sometimes in drawings, sometimes in patterns and sometimes only by words. Such cases as the latter often cause trouble. For instance, a smith has been making different sizes of rings from inside measure. Another man has been given the job of finishing and he gives the smith the outside measure. Then, of course, the ring is too large and the forger has to shoulder the mistake. The best way is to have all the figures down in black and white.

Now, suppose we have an order for a ring that finishes $15\frac{1}{4}$ inches inside and is $\frac{1}{2}$ inch thick and $3\frac{3}{4}$ inches wide. It will take a bar that is $\frac{3}{4}$ inch thick, $3\frac{7}{4}$ inches wide and $50^{\frac{3}{4}}$ inches long. I add the thickness of the stock to the diameter and multiply by $3^{\frac{1}{4}}$ thus: $15\frac{1}{4} \times \frac{3}{4} = 16$ inches and $16 \times 3^{\frac{1}{4}} = 50^{\frac{3}{4}}$ inches. Now I scarf the ends of the

bar on the same side, A, Fig. 1, and then heat about one third of the length and concave as far as I heat, B, Fig. 1. Then I bend the bar to a circle, as at C. Now I heat again, concave the center and. with my ring tongs jump the work on the block until the lap closes. Then I heat about 6 inches from the inside and then with my ring on the horn of the anvil and my flatter on the place I have heated, I can, with a few blows, drive the lap together so tight that there will be no springing out when I weld. After the ring is rounded and cooled, if it is to be casehardened, it will come out of the bath much better if heated up again and cooled slowly. I sometimes make small rings without welding. It takes a little longer, but there is no fault found with time when you get a good thing. In making this kind of ring, from stock 3 or 4 inches wide, I drill a %-inch hole in each end. This

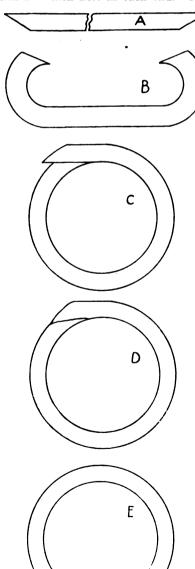
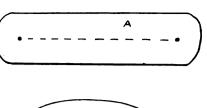


FIG. 1.—FORGING WELDED RINGS



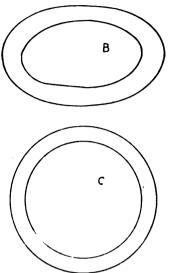


FIG. 2.—FORGING WELDLESS RINGS

helps to guide the chisel when cutting. The engraving at Fig. 2 shows the steps in forging rings from the solid.

The Smith and His Work-5.

BY ROBT. B. KERR.

Forging Mild Steel.

Mild steel is the most universally used of all metals. Its extreme strength and toughness, the facility with which it can be fashioned into almost any shape, by any of the processes by which metal is worked, has made it indispensable in the mechanical arts. It is considerably stronger and tougher than iron and as it answers nearly every purpose that the latter is used for, and does it better, it has to a great extent superseded that metal for machine and general forgings. As a comparison of strength, good staybolt iron will stand a tensile or pulling strain of about 49,000 pounds to the square inch, while mild machinery steel in the bar will stand 65,000 to 70,000 pounds.

The statement is frequently made as an argument against its use that it is not so reliable as iron, that it is more brittle, crystalizes more easily and that forgings made from it are liable to give way at any time without warning, etc. This prejudice has little to uphold it, for, while steel forgings will sometimes break unnecessarily, it will be found in most cases, if looked into, to result from improper forgings. While not nearly so liable to damage in forging as the higher carbon steels the metal is by no means

"foolproof," and a reasonable amount of care must be used in working it.

The first essential to success in working mild steel lies in the heating. Except where necessary to weld, never bring a piece of it to a welding heat, for if this is done it becomes harsh and brittle and if subjected to strain will snap off, showing a coarse, crystaline fracture. Work just below the welding heat.

If the piece has to be drawn out, forge evenly on all sides to prevent strains. Do not attempt to get too much out of a heat; stop forging whenever the work gets down to a dull red; cold forging strains the steel.

Upsetting steel loosens the grain, and where it is done the work should always be thoroughly hammered afterwards to bring it to its original state.

A few years ago the writer was in one of the plants of the American Locomotive Company. While there the blacksmith foreman, a gentleman of life-long experience, told me that it was his experience that upsetting mild steel was one of the most detrimental operations to which it could be subjected. It had in fact, given so much trouble that he had entirely abandoned the practice, preferring instead to start with plenty of stock and draw down to size.

He furthermore said that, contrary to general belief, he had seen no bad effects from upsetting cast steel, if the piece was afterwards well hammered, but that mild steel once upset could never be restored to its original state. The theory he advanced was that the structure of the steel being of unequal density the upsetting created minute kinks, or "shorts," in the grain; the subsequent hammering only serving to make them worse by doubling them together.

Be this as it may, I have observed



SHOP OF HAYDEN STANLEY OF MEBRASKA

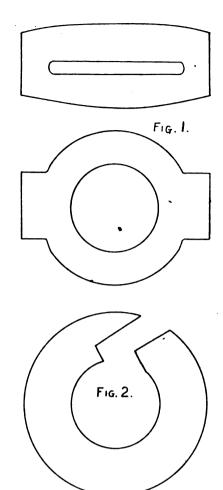


FIG. 1 AND 2.—FORGING RINGS AND LARGE NUTS

that mild steel that has been welded will frequently break just back of the weld, where it has been upset. I do not think, however, that this is caused so much by upsetting as by the strains created when the weld was made, the part welded, owing to hammering, becoming more dense than the rest of the piece, consequently has not the same elasticity. This is particularly noticeable in long rods that have been welded.

The remedy for this is found in annealing. In the case of long work this is not always practicable, but all such work should at least be brought up to a dull red for some distance back of the weld on both sides and then allowed to cool off slowly. All short forgings, whether welded or not, especially machine parts that are subject to severe strain, should be treated in the same way, and all parts subject to vibratory strains, such as cranks, etc., should be thoroughly annealed. If this were done breakages would be reduced to a minimum.

While mild steel can be welded readily it is recommended, as mentioned in a previous article, that as far as possible work ought to be forged from the solid.

The metal is peculiarly adapted for this, on account of the ease with which it can be fashioned into any desired shape, without constantly keeping it at a high heat, or of the fiber coming loose, as in the case of iron. The perfect safety with which it can be punched, without danger of splitting out, is in itself a great factor.

For instance, collars, especially small ones, are troublesome to make by the old method. Try this:

Take a piece of steel of sufficient depth and thick enough to form the sides, and with a thin, flat punch make a slot through it, equal in length to twice the inside diameter of the finished collar. Open the slot up by upsetting till the hole is round; trim off the ends, leaving the stock of equal thickness all around; round up on a mandrel and you have a solid weldless collar, with little labor. See Fig. 1.

This is also an excellent method of punching the eyes of draft hooks, or shackles—far superior and quicker than the usual way of upsetting or doubling the stock and then opening up with a round punch.

The same thing applies to the holes punched in the ends of either round or flat braces. Every wagon or plow smith should have a few thin, flat punches of different sizes handy for such work. In punching holes in braces, for anything that has to come to exact length, there is never any uncertainty as to how much stock to allow for doubling or upsetting. Mark for the center of the hole to be punched and drive the flat punch through, holding one end of the tool to the center mark; the upsetting will bring it back just right. This

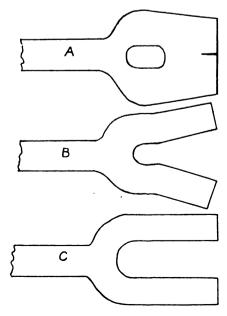
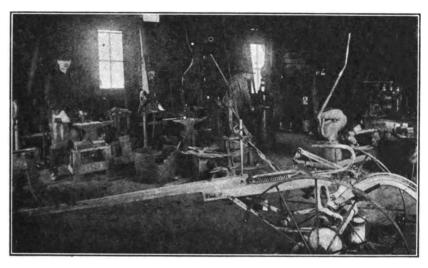


FIG. 3.—FORGING JAW ENDS



GENERAL SHOP OF MR. A. J. LOEB IN IOWA

rule holds good for all end holes. The writer has punched hundreds of sets of harrow bars by this method; for this purpose it has no equal.

One rule, however, must be observed, for end holes especially. If the brace, hook or other work is iron always take a welding heat on it first. If the work is steel the rule is reversed, for if a welding heat is taken, no matter how much you may hammer it, the hole will almost invariably split open; otherwise it will stand any amount of stretching.

Forging Nuts.

Large nuts can be made in two different ways. Either by welding up or forging from the solid. If stock of sufficient size is available forge from the solid every time. Cut off a piece of round steel of proper size, punch a hole directly in the center. Flatten the faces, bringing up the corners nicely. Keep the hole under required

across the corners and cut off same length as the finished depth. This will give sufficient stock to face up on both ends.

To weld up a nut, measure off a piece of heavy, flat stock, iron preferred; bend into a collar but do not quite close. Then with a sharp chisel cut out a short V in the one end, leaving the outside leg longest, see Fig. 2. Cut the other end wedge-shaped to fit; close over a mandrel a trifle larger than the required size, so as to give the scarfs a chance to come together solidly. Get a clean, soft heat, weld in a swage, or, better still, a V tool, using a mandrel of the proper size; shape up and finish.

Thumb nuts are usually troublesome little things to forge by the old method. Take a piece of round mild steel, large enough to form the barrel. Flatten out the extreme end to the thickness required for the lugs. Punch a small hole at the shoulder, cut out and



A WELL BUILT SHOP OF OKLAHOMA

size until almost finished, then drift out. To judge the proper amount of stock, use steel of the same diameter as the finished nut is required to be spread as required. Cut off barrel to required length; drill the hole. One, or at the most two heats are usually sufficient.

Jawe

These are of infinite variety, according to their particular purpose and there are two recognized methods of forging them; one by jumping on the stem, the other by working from the solid. The method sometimes used of welding two flat pieces together and then opening out is a makeshift and not suitable for any but the roughest work. If, however, it has to be done that way trim corners and offset the stock for both sides first thing. Take separate heats; never double the stock together, it is almost impossible to get a solid weld at the neck, where it is most needed.

Jumping on is all right—sometimes—with iron, but should never be attempted with steel. In making by this method the jaw should always be bent to shape before welding, and when the heat is ready drop the jaw over an upright tool in the anvil. Leave plenty of scarf all around the stem and work them in well with a fuller. Finish the jaw at a good, sharp heat, straining the weld as little as possible. Leave a good fillet in the neck to make the jaw as strong as possible.

In forging from the solid draw the stem down first; beware of checks. The stock used should be a little more than the combined thickness of both sides of the jaw. Punch a hole edgeways through the piece A, Fig. 3, far enough removed from the neck to insure plenty of stock being left, using a small oval-shaped punch. Then, setting the piece on end, stem down, split it equally, B, Fig. 3. Open the cut up with a fuller, using a small one at first.

If the jaw is a narrow one all that is then necessary is to slip a jaw piece into it and flatten to size. If it is to be wide slip the opened jaw over an upright tool fixed in the anvil and fuller it out from behind, working it on both sides until it is of required size and of equal thickness throughout. Then insert the jaw piece and finish smoothly all over. C, Fig. 3.

In making forgings similar to above or any other machine parts, the young smith should cultivate the habit of working close to sizes. In the first place, study the drawing or model carefully and determine to yourself the method you will pursue in forging the job, and also the stock most suitable. Remember that the chief essential to success in forging as in all other things is intelligent self reliance; have self confidence; do your own thinking and act accordingly. Do not trust too much to either your eyes or your memory. While a

true eye and a good memory are most valuable assets, neither are infallible, so get sizes down in black and white and in working to them use the calipers and the rule frequently. All squared work should be tested and made correct. Work that has to be finished should be left with ample stock to machine at least one sixteenth on all sides.

In making forgings with square corners be careful not to gall the inside. To prevent this, work up to a square corner outside before bringing the bend quite in to the square and never let it get in beyond the square—it will most certainly gall in bringing it out again. To get a good solid corner take a piece of stock twice the thickness required, fuller down on each side of the corner and draw away from it. This will leave ample stock for a sharp corner outside with a fillet inside, and will always be solid.

To weld a collar on a shaft, measure collar off, bend round to size, upset shaft slightly and put back in the fire. Take a sharp chisel and trim the ends of the collar, leaving a square joint and short enough so that when closed on the shaft the joint will be left from one eighth to one quarter inch open, depending on size of job. Heat the shaft to almost a welding heat, remove scale, sprinkle with welding flux; slip the collar on and take a nice soft heat. Weld in a swage; hammer as little as possible after the joint comes up tight.

Lastly, be sure that whatever job you have on hand is right before it leaves you. Be your own inspector in this respect. Having satisfied yourself that your work is right, any further labor is superfluous; it is finished, lay it down.

A Talk on Casehardening.

W. v. LAIZURE.

Wrought iron does not possess the property of hardening; articles made of wrought iron may be converted into steel without depriving the interior of its natural structure. The process is called casehardening. The object of casehardening is to obtain an external steel case with a core of fibrous iron. The effect is produced with an air-tight box and continuous heat from twelve to fifteen hours. A cast-iron box is good for this work.

Our practice is to place some limestone on the bottom of the box; cover that with boneblack and then place the work in the box until we have filled it with work and boneblack, being careful

not to let the articles come in contact with the box, or with each other. We then put a good lid on the box and have the furnace ready at about 1450 degrees. We have no special furnace for this work, but use our forging furnace. We put test pieces in and then we can see by breaking just what has been done. We harden lots of cutters and we give them up to twenty-four hours' time in the furnace. These cutters are used on milling machines and must be very hard. Crank pin nuts and small nuts we put on mandrel and place in box to harden. We use the boneblack that has been used once for this class of work. and it seems to do very well. We also caseharden with potash at the fire. This class of work is always in a hurry.

I find that all bad jobs of hardening are due to bad heating. I think that all heating for casehardening should be done carefully, not overheat, and give plenty of time.

There is no operation connected with

toughness. If a thicker case is desired, the articles may be repacked for another heat corresponding to the depth of the hardened case.

Building and Repairing Locomotive Frames.

JAS. T. M'SWEENEY.

Making locomotive frames and repairing them has been the subject for a great deal of discussion, and yet we have only commenced. The one thing uppermost in the minds of the mechanical world is to eliminate the breaking of frames and how to repair them the cheapest when broken.

The B. & O. R. R. do not make any new frames at the Company's shop, at Garrett, Ind.; our work consists of repairing frames, and we do this in the smithshop or under the engine in the cheapest way we can conceive. In the smithshop we handle our frames with a screw lift and an angle iron wheel around the frame. Two men can turn this frame when there is no heat on



SHOEING SHOP AND RESTAURANT OF MR. F. W. STRUBEL

casehardening which requires more watchfulness than that of heating, and if the parts to be hardened are carefully packed in boneblack and given the proper time for heating we will have a good job.

Pack the articles in an iron box, keeping them about one inch apart, and cover all threads with clay; after packing, put lid on box with bolts and clay between lid and box; bring to a lemon color heat and keep at that heat for about twelve or fourteen hours. Have a bath with water flowing in at the bottom and an overflow at the top, with a netting in the bottom of the bath so work will not touch bottom of the tank. The result will be a case about 3 of an inch deep, with an interior of material retaining its original strength and

frame, though we use six men when making a weld. We make our welds with sledges and under the steam hammer when we can.

We make V welds with sledges, as I think the iron is driven together and not stretched as it would be if made under steam hammer. All welds on main frame rails are made with lap welds and V welds. The lap welds we make, if possible, under the steam hammer. This gives you a chance to see that both pieces have the proper heat before putting them together and then you can be sure this weld is not going to break again in that place.

In making a fork weld or an end V weld the heat should be taken separate. It is a hard matter to draw the heat through to the center point of weld of

this kind. I do not consider in my judgment that this is a good weld. Welding on a pedestal jaw or leg to back of frame in this manner with separate heats and side heats makes a good weld. It takes a great deal of time and labor to prepare this weld, but it depends a great deal on the location of the break in the frame as to how it shall be repaired. Every man thinks his way is the best until he tries or sees a new way.

Welding Frames Under Engines With Oil

We have put a good many new halfpedestal jaws on frames under engines where the end of the frame for the pedestal brace was broken off and have had very good success with all those jack is taken out. By doing this the heat reaches the center of frame.

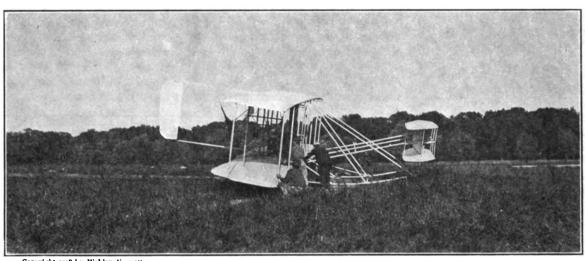
Our furnace is built four inches from the frame to the bottom of the furnace and three inches on the top and sides. The burner is placed so the flame does not strike directly on the frame, but passes under the frame and then around over the sides and top. We use crude and carbon oil—twelve to fourteen gallons to make a weld.

By this method there is no waste to your frame, for by the time you have a heat and the frame rammed to length, the frame is larger by a quarter of an inch all around than it was when you started to weld. The oil comes to the burner by gravity, where it is mixed with time and when done properly seems to give entire satisfaction. I believe most of the roads have given it a trial.

Applying Transfer Designs to Wagons and Buggies.

J. A. L. MOLLER. Palm, Fechteler & Co.

The best method of applying a medium size transfer to wagons and buggies, that is, to a smooth-painted surface, is as follows: First, clean the surface to be decorated from grease; then size the transfers with a very thin coat of quick-drying varnish, preferably the special varnish, which is made for the purpose. As soon as this is very tacky apply the transfer



Copyright 1908 by Waldon Fawcett

THE WRIGHT AEROPLANE ABOUT TO FLY

welds. We spread the frame with a jack and a piece of iron with slot cut in one end and two wedges, driving the wedges from both sides. We do not have much trouble in getting them apart and have made two welds of this kind in thirteen hours, with three men. We build our furnace of ordinary fire brick, with holes for the burner and a peep hole. Our furnace stands on three posts made from scrap flues or old pipe-anything to hold the plate to start furnace on. We use hooks to pull posts from under the furnace, allowing the bricks to drop in the pit. Then we use a small ram made in shape of a flatter or face of sledge on the end of a bar to weld up the inside of frame. We weld up the outside with sledges, the last weld on which I use a bar of the same kind as I use on the inside. We use a heavy ram at the back end of frame to drive frame to length and find this better than clamps, for so often you cannot get the clamps on in the right place. I also have a jack to keep frame apart while taking heat. When heat is ready this

seventy to one hundred pounds of compressed air. You must be governed by the length of your heat as to how much your frame will shorten.

Welding Frames With Thermit.

The B. & O. R. R. has made a number of welds with Thermit this year at different shops along their line. There were two made at the Garrett shop which have proved a success so far. Both engines were class B-18, with steel frames broken in different places. This class of engine has given a great deal of trouble in breaking main frame, being a cross compound. At first, the frames broke over the first pair of driving wheels. The frames at this point on. some of those engines have been increased from 4 by 5½ inches to 5 inches by 8 inches; some that have had new steel ends put on the parts that have been increased have not broken. The cost of making one of those welds with Thermit was twenty dollars for material, without any labor. This method of welding and repairing frames takes little

and smooth it down with a rubber roller. Then wet the transfer thoroughly, which can best be done by means of a felt roller. This has the advantage of smoothing down while it is wetting the paper. After the paper is thoroughly saturated leave it probably a minute's time to soak through, and then pull off the paper. Now comes the really important part of the operation, and which so many otherwise good decorators have been known to The transfer must be thorneglect. oughly cleaned at once of the scum that has adhered to it from the This can also best be done paper. by means of a wet felt roller, which should be rolled hard and thoroughly over the transfer. The transfer should then be tapped dry with a soft chamois skin. If this last part of operation is not thoroughly the attended to, the gum, which is on the face of the transfer, is exposed to the air and dries much quicker than the varnish underneath, and the transfer is very likely to crack, no matter how

well or strongly it is made. The superfluous varnish, which appears around the edges and in the open parts of the design, can now be cleaned off by means of turpentine, kerosene, benzine, ammonia or any detergent. We advise the use of turpentine, which is the best when slightly diluted with water. This part of the operation can be gone through with as soon as the transfers have been applied, providing the transfer is seasoned, but where goods are fresh it is best to wait twenty minutes or so, as there is then less danger of washing up any of the colors. In that case the design should not be rubbed hard with the turpentine, but merely gone over very lightly and quickly and immediately removed with a soft, dry rag. After the transfer has been allowed to dry it can be varnished over.

The only serious difference where a large and solid-bodied transfer is used is that it is sometimes advisable to sprinkle the wagon with water just before the transfer is applied. This is done as the water carries away all air bubbles with it when the transfer is rolled, which rolling should be done from the center towards the edges.

A Word About the Shoe and Its Fitting.—2.

E. H. MALOON:

Now, I'll proceed to shock probably nine tenths of the trade and cure this same horse my way. Take off those shoes that the mechanic has seen fit to put on and don't try to work up a reputation, but take your time. Clean out the foot and thin out the sole, not too much, but enough to allow it to give under pressure from above. Take enough off the wall to bring the foot at the right angle. I'm not much in favor of taking too much off the heel. Just leave the heel alone. Make your foot level and then run your rasp around the edge of the toe until you have the wall of uniform thickness, or nearly so all around, as it was when brought off the range. Next, take your foot up in front and topdress the foot till you have dressed to the mark around. Not rolled, mind you, but a good, straight dressing all the way. Every foot cannot, of course, be dressed the same, you know, but if you use a little good judgment you can readily adapt yourself to using my method, not only mine but many others also. The idea is to give the workings of the foot plenty of room when the horse makes a step in the expansion of the wall and the giving of the sole at the same time. You cannot thin one without thinning the other. That is where a flat-footed horse in the cities has it on his cup-footed brother. He has a thin sole and also a thin wall.

Did you ever pull a nail and then feel of that nail? It was hot, wasn't it? Do you suppose that nail would scorch a foot if it were driven too close to the life of a foot?



"Say there, Mister Editor, what's this subscriber's service that I hear so much about? I want to subscribe to the paper, but I want you to explain what I get besides the paper so I can get full return on my investment."

The stranger handed the Editor his card and made himself comfortable in Benton's chair.

"Glad to have you mention subscriber's service, Mr. Wrightson. If I'm not mistaken, you've just opened up the shop on Hampton Road at Barton?"

"Yes, I just opened up down there and while I've got a pretty good shop, and an experience of five years under old man Temple, I want your paper in the shop. Temple had it before he struck his anvil for the last time and he always made us boys read it after he got through. He always kept the papers on file in the shop. Now, I want you to send it to me until I tell you to stop it. I'll pay for a couple of years in advance and then I want to know how I can get the full benefit of your paper and your subscriber's service." And the stranger gave the Editor a bill and received a receipt in return.

After thanking his visitor for the order the Editor said: "Our subscriber's service is simply a service offered to our readers to enable them to get all there is in the paper. For instance, we'll say that you want to buy a number of machines and tools. You write a letter to us and we'll give your name to the manufacturers of the tools or machines that you want to buy, tell them what you want and about when you want it. This saves you the trouble, time and expense of writing a lot of letters. All you do is to write one letter to us. Now suppose you want to

know who makes a certain tool or machine -if we haven't the information on hand we'll get it for you. There are times, of course, when we can't get the information you may want, but it's not very often. Then there is our question and answer service. The questions and answers published in the paper are but a part of those asked by readers. There are always cases where a reader cannot wait to have his question answered in the paper—then we answer it by mail. Of course, if a reader wants his questions answered immediately by mail he usually encloses a stamp for reply. In connection with our subscriber's service is the Current Heavy Hardware Price List that is published every month. This list is as up-to-date as it is possible to keep it by means of a system of correspondents in the various trading centers.

"Another important branch of our service is the protecting of our readers. We supply you with a number of Pink Buffalo stamps, which you paste on all your letters to jobbers, manufacturers and dealers. This stamp tells them that you are one of 'Our Folks'-it insists upon a fair and square deal and lets the firms with whom you trade know that we stand back of you to insist upon honest dealing. Then we invite readers to write to our book department when in need of books of any kind. We can either supply you direct or give the name of the publishers of practically any book in print. We have a number of excellent craft books that we can recommend highly, and the book department is always willing to help any subscriber to get the book he wants.

"Then there is still another little favor we do. We help subscribers to find better locations. In the past year or so we have assisted quite a few of 'Our Folks' to new business places. Readers who know of localities needing a good smith are asked to advise us. We turn the hint over to our readers and it seldom takes long to get a good man in the place.

"Besides what I have explained there are other features in connection with the paper that you, no doubt, know about. For instance, if a reader desires a series of articles on a certain subject in which he is interested we endeavor to secure a series by some good writer. If a reader differs with any writer he is invited to write a letter and detail his arguments for publication. We also invite 'Our Folks' to write us a letter at least once a year to tell how they like the paper and to make suggestions for bettering it. If a reader can write oftener, so much the better. The oftener we hear from our friends the better we like it."

"Well, Mr. Editor," said the stranger, "seems to me you do about as much as you can for subscribers. If a man can't get his money's worth and more he's no smith. I'm not worried about getting the worth of my money. I just want to get the full benefit of a good trade paper. If your subscription price was five dollars a year I'd pay it and then I'd be getting the paper cheap. Well, I must be going —want to catch that next train home." And with a hearty handshake the Editor's visitor was gone.

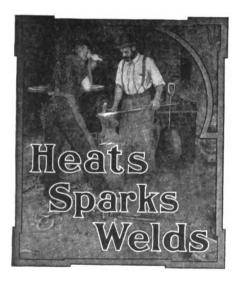
The Village Blacksmith.

Mr. John Donnelly, the author of this parody on Longfellow's famous poem, is one of our Connecticut readers. He has favored our columns with a number of original poetical contributions.

Under a spreading chestnut tree The village smithy stands. Tom Tardy is the smith and he Owns neither house nor lands. Some days he doesn't strike a lick, He drinks whene'er he can. He gets most of his booze on tick, And he pays not any man. For an apron he wears a sack That once enveloped corn. His anvil's face shows many cracks, It's minus half the horn. 'Tis also sadly down at heel, Around its waist a chain, And when he strikes its face of steel, It groans as if in pain.

When on its horn he turns a shoe, It moans like one oppressed. Although Tom says, and truly too, He often lets it rest. His hammer, too, shows signs of wear Upon its wretched face. It seems to say "I'm in despair. I've run a losing race.' Today as I was passing by, With many a vicious rap Tom banged a wedge into its eye, And chucked it in the scrap. And then he wandered down the street And to the corner store, Where many of his cronies meet. To hang around the door.

Written expressly for THE AMERICAN BLACKSMITH.



A lazy smith will have lazy helpers.

Don't worry about what your competitor does. It's what you do that counts most for or against you.

John Hogan says: "Most every man has a chance to get rich dishonestly—that's why I'm poor."

Caring for tools properly is better, cheaper and more workmanlike than continually buying new ones.

Read the paper from cover to cover? Better go through again for fear you've missed some good chance for profit.

The face of the happy, cheerful man draws trade like a magnet draws steel. Backed by proper work it holds it, too.

A good general smith can learn of a good location by communicating with Nic. Zirbes, White Earth. North Dakota.

Everything desirable must be paid for or worked for. Things which cost nothing are usually worth no more than they cost.

What do you know about auto repairing? If you do this work let us have an interesting article for publication. Write right now.

A good smith well willed, a neat shop well filled, a little garden well tilled.—Can you wish for better in your fight for success?

The Indiana, the balloon which made the best record in the recent big race, is said to have been built by a former Ohio blacksmith.

A North Carolina smith boasts of having put on 105,864 shoes in his sixteen years of business. Last year he says he put on 7,310. He has no help—does all his work alone.

In the Canadian Northwest is an opening for a good all-round general smith. If you want to locate there address Mr. J. J. Zeller, Canora, Sask., Canada, for further information.

What does it profit a man if he be the best business-getter in the world, but a poor workman? Is he better off who, with uninviting shop and personality, yet is a thorough mechanic?

If Tom Tardy changed from one tool to another as quickly as he sheds his apron and dons his hat and coat on lodge night, lots of valuable time would be saved in at least one shop.

Work alone never brings the little extras in life. The man who works like a horse usually gets the same wages—three meals and a bed. It's the man who mixes brains with his work who gets the extras.

It's time wasted to fuss and fume about how an accident could have been prevented. Better to be busy repairing and making things right. After that it's time to think seriously about prevention—for the next time.

Are you prepared to take care of them? They are advertised in the farm papers and farmers are buying them. When they break down and need fixing the farmer will come to you. Are you prepared to take care of the automobile?

Of course, you put down what customers owe, but do you keep a record of what the shop owes you? It owes you and should receive credit for every cent it pays back. It's not red tape. It's business, and business must be done in a business way.

Still studying and learning are the old veterans of the craft. It's the man with an experience of about three months who thinks he knows it all. The men who have stood behind the anvil for thirty, forty or fifty years are just beginning to learn how limited their knowledge is.

Don't let your life be all hoofs and hard metal. Get close to nature occasionally. Get interested in a garden. If you

haven't time for a large one let it be small. But get away occasionally from the anvil and the forge—you'll feel better for it and your work'll be better, too.

The successful smith must be a business man as well as a mechanic. It's one thing to run a sewing machine, but quite another to sell it. The smith must know how to do his work right, know how to get customers, how to hold them and how to do business in a business way. And "Our Folks" are doing it every day in the week.

To protect horses from flies, The Farm Journal gives the following: Take two or three small handfuls of green walnut leaves; over them pour two or three quarts of soft cold water. Let this stand over night. Pour, next morning, into a kettle and boil for fifteen minutes. When cold it is ready to use. Saturate a sponge with the solution and rub the horse wherever the flies are troublesome.

Some men think it is good salesmanship to sell a man something they know he doesn't need or want. A true salesman is the chap who sells a man something because he knows the man needs it—he upholds the price and gets what his goods are worth. It's a sign of poor salesmanship to cut the price. When a smith cuts prices he admits that he is either a poor salesman or a poor workman.

Last Friday, Tom didn't open shop at all, but as he passed the place on his way home from the ball park he found these lines on a piece of paper tacked to the shop door:

Up in the great big chestnut tree
Old Thomas Tardy stands.
The tree is near the baseball park—
A view of the game commands.
And here you'll find our village smith
Most every day at four.

He'd sooner see a baseball game— Says "Fishin's awful pore."

Nothing so good as the good old craft. Is that your sentiment? Are you putting heart and soul into the trade and reaping something more than a mere existence? You wouldn't expect to draw your money from a bank into which you had never placed it? Then why expect anything out of a business into which you put little or nothing? Put real energetic effort into the shop and the shop work. Be in the shop not only in body, but with heart, soul and mind as well. Then how can your harvest be anything else than just what you want?

Boss—(to Reddy the shop kid). Thought I told you to call for Mr. Brown's horse this morning?

Reddy-Aw, I forgot.

First Fireman—Reddy! Where's the coal I asked you to put in my box?

Reddy-Aw, I forgot.

Second Fireman—Reddy, where's the borax I told you to get me, 'bout an hour ago?

Reddy—Aw, I forgot.
First Floorman—Hey Red, where are those nails I sent you for?
Reddy—Aw, I forgot.

Second Floorman—Say Red, who won the ball game last Saturday?

Reddy (promptly)—The Red Eagles, seven to four and Kid Googan pitched the finest game o' the season.

American Association of Blacksmiths and Horseshoers.

The matter of prices is one that interests every live smith—not only selling, but cost prices as well. Costs in all lines have advanced much more than have selling prices, and those smiths who have not made any advances at all in their price schedules in the past year or two are doing business on a very close margin or at an actual loss. The smith is the last man on earth who should absorb the advances that have been made in his costs. If any body of craftsmen earn a fair return for their labor it is the smiths.

There is no excuse whatever for any smith doing business at a loss. Have you ever heard of anybody building up a successful business by cutting prices and selling at a loss? And when it comes to selling at a close margin in order to win trade away from a competitor it's usually the man who sells close that goes under first.

The solution of the price-cutting evil is to get the smiths to work in harmony—to work together. One craftsman pulling this way and another that way will never result in anything but dissatisfaction. Working together as one man is the ideal, and organization is the solution. Other crafts are thoroughly organized, why not the smith? The trades on every side are protected by organization. When they decide that a better price is necessary they usually get it. When matters are not arranged exactly suitable to their needs and desires they take steps to change things satisfactorily. How are these matters brought about? Could they do anything at all if they were not organized?

And members of the smithing craft are not the only ones to say that the smiths should organize. Fair-minded customers agree that good craftsmen should organize for protection. Rightminded customers believe that the blacksmith should get a fair profit on his work. Manufacturers, dealers and supply houses are encouraging the movement—they strongly believe that the smith is entitled to better prices, coöperation and protection. The biggest obstacle in the path is the fear and jealousy among the smiths themselves.

Blacksmiths' interests are the same the country over. Your interests and desires are the same as your neighbor's. An organization will benefit you. If it benefits you it will benefit your neighbor. If an organization benefits your neighbor you should have very little difficulty in getting his interest and help. You can start an organization in your county. You can make it a success. And you'll be surprised how easy it is with my easy plans.

Just talk to your brother smiths about this matter. Ask their opinion of a smiths' organization. Ask if

they'll help. You'll find them all willing and anxious. Then write to me, ask for my easy plans, ask for my help. I'll put you on the right track. I'll help you to start a healthy organization in your county. And there's no time like the present. Write to me today. P. O. Box 974, Buffalo, N. Y., is my address. Do it now right away.

THE SECRETARY.



In jacking a car a certain amount of common sense is necessary. Don't, as in a case seen recently, place the jack under a truss rod and then attempt to raise the car. See that the jack is placed under a part that can support the weight of the part to be lifted. Serious damage is liable to result otherwise. G. N. P., Ohio.

As rainwater contains little or none of the mineral elements found in hard water the automobile repairman will do well to see that his cistern is well filled for the use of his customers. The deposit in the water jacket and radiator is caused by the minerals in spring and hard water. Tell your customers about it and offer them the use of your rain barrel or cistern.

R. M. G., Pennsylvania.

There is more than one way of grasping the starting crank of an automobile. As ordinarily practiced, the hand in grasping the handle is so placed that the thumb and fingers encircle it. Such a method is comparatively safe, if the operator is pulling upward the crank, but decidedly unsafe, if he should press down on the crank and a back-fire occur. The safer method, and one which will allow the hand to leave the handle without injury, whether it is being pulled up or pressed down, is to place the thumb on the same side of the handle that the fingers are placed, so that the handle is not entirely encircled, allowing the handle to slip out of the grasp when it is being pressed down and permitting the fingers to release the handle if it is being pulled up, at the time of back-fire. T. B. J., Wisconsin.

The Treatment of Low Carbon Steel.

W. P. WOODSIDE.

A great deal has been done by the automobile industries in increasing the

efficiency of what was generally known heretofore as soft steel, or machine steel. Now, these steels are known by their carbon percentage. For example, a customer will specify an open-hearth steel thus: Carbon, .10 to .20; Manganese, .40 to .60; Sulphur and Phosphorus, .04 and under; Silicon, from a trace to .08. A steel of this nature would most likely be used in work requiring casehardening.

Another steel which might be known as open-hearth is composed of: Carbon, .30 to .40; Manganese, .60 to .80; Sulphur and Phosphorus, .04 or under; Silicon, trace to .08. This steel would most likely be used in a part not requiring casehardening, but have to stand strain and sudden shocks. Now, in its natural condit on, or in other words, in the condition it leaves the hammer or rolls, it is not in its best condition to withstand strain and shocks. So, in order to increase the efficiency of this steel, it is what is now known as heat-treated, which is generally done in the following manner:

The piece or pieces are put into a furnace, equipped with a pyrometer, and heated to a degree of heat that will produce a close, fine structure in the material when quenched in oil or water. For example, we will say this stock is to be used in an automobile steering arm. The stock would be heated up to about 1600 degrees Fahr. and cooled in oil or water. Then reheated to 800

or 1025 degrees Fahr., according to specifications by the engineering department of the firm using the part. This treating is done previous to the machining of the steel.

painting of the car and from the renewing of batteries to the boring of a cylinder, all is done under one roof. The auto-repairer desiring some of the autoists' money must therefore be

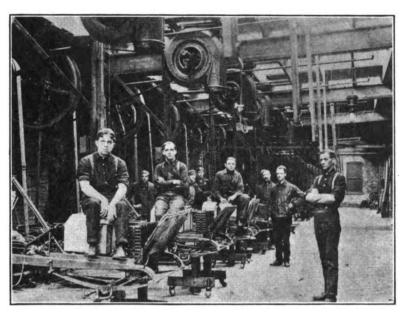


FIG. 1.—THE TESTING ROOM OF A LARGE AUTOMOBILE PLANT

It is wonderful what results are now obtained from what was formerly known as soft steel when the metal is of the proper analysis and properly heat-treated for the particular use.

Testing New Automobiles and Repairing Old Ones.

The engraving, Fig. 1, is a view in the testing department of one of Michigan's large automobile plants. The motors are tested thoroughly here. The rear end of the automobile is raised from the floor and a pulley placed on the rear axle. A shaft runs the entire length of the testing room with pulleys directly above the pulleys on the automobiles being tested. Then by means of belts the large fans—one above each automobile—are operated by the motors being tested. That is, each motor operates the fan above it. These fans draw off the exhaust gases from the motors and thus keep the atmosphere in the testing room fresh and pure.

The engraving at Fig. 2 shows an automobile repair shop where all kinds of repairing, from machine work and blacksmithing to painting, is done. The shop looks rather ill kept, but you can hardly expect things to be otherwise when you realize that all kinds of work is done here on all kinds and conditions of automobiles. From the replacing of a spark plug to the

prepared to do all kinds of work and do it at short notice.

What To Do To a New Car.

First of all and the matter of most importance is to see that all movable parts are lubricated, see that the lubricating system is working correctly and that oil is reaching all bearings, etc. Then fill the water tank, if a water-cooled engine, with clean water. Now take the gasoline funnel and fill the fuel tank, filtering the gasoline through a

screw them down too tight—just tight enough to prevent their being lost is right. After filling the gasoline tank see that the fuel flows freely to the carburetor. Press down on the primer until the gasoline drips from the carburetor.

The car is now ready to start. To do this first see that the brakes are set and that the clutch is disengaged. Then turn on the switch of the sparking mechanism, retard the spark control lever as far as possible and open the throttle. Now turn the starting crank. If the engine doesn't start after two or three turns prime the carburetor, not too much, but sufficient to give the proper fuel mixture. If too rich a mixture is admitted to the cylinder it will explode and if too much gasoline is forced into the carburetor it will need to be pumped out by cranking until all of it has been forced out.

Right here may be said a word or two regarding the correct and incorrect method of cranking. Grasp the starting handle in the left hand and pulling up on the handle turn it toward the right with a quick, sharp movement. It is also well to grasp the handle more with the fingers than with the whole hand, so that should the engine back-fire the fingers will open and be out of harm's way. Whereas, if the whole hand is wrapped around the handle, the handle cannot be so easily released and the body is likely to be pulled down, bringing the face in contact with the radiator top. This is also liable to result if the right hand is used to crank the engine, while if the handle strikes the wrist

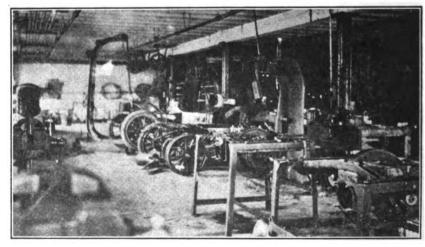


FIG. 2.—AN AUTOMOBILE REPAIR SHOP WHERE ALL MANNER OF WORK IS DONE

chamois skin. Use fresh gasoline that is free from water and dirt. Then replace the plugs in both the water tank and the gasoline tank. Don't a broken wrist or arm is a likely result.

Too much care and caution cannot be exercised in cranking a motor, especially if the operator is a novice. To

the experienced repairman and driver it becomes second nature to crank an automobile correctly.

The Reliable-Dayton High-Wheeled Motor Car.

The Reliable-Dayton motor car is built in three distinct styles; runabout or single seat; surrey or double seat and as a light delivery wagon. The chassis of the car is shown in Fig. 1. The motor is of the two-cylinder opposed type with water jacket cast integral. The motor is hung directly on the main frame. The radiator is suspended at front of car and circulation of water is obtained by means of gear pump. Lubrication is obtained by means of a mechanical four-feed oiler mounted over crank case. The gasoline tank is located under the seat. The car is controlled by means of a T bar-side lever for steering, while the spark and throttle control levers are on the steering column.

The transmission is of the sliding gear type with two speeds forward and a reverse. Power is transmitted by means of shaft to countershaft and thence by means of chains to rear wheels. The valves of the motor are all accessible from the top and may be easily removed through plugs screwed into the cylinder head. The reader may familiarize himself with the other parts of the chassis by examining the engraving carefully.

In Fig. 2 is shown the Reliable-Dayton car complete with body and top.

Adjusting, Repairing and Caring for an Automobile—9. Storage Batteries, Dry Cells and Plugs.

It should be remembered that a new storage battery does not give nearly so find it will become more satisfactory the longer it is used.

There are many theories and many fallacies about storage batteries. You

to solder a piece of pure lead wire onto the brass wire, using the lead to connect to battery terminal, as lead will not corrode. Batteries, either storage or

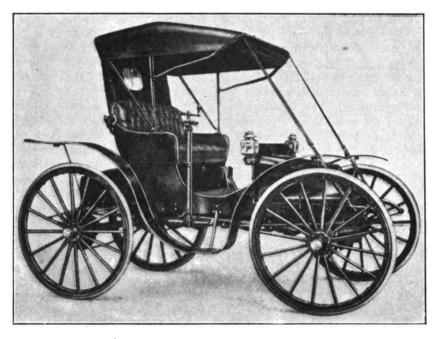


FIG. 2.—THE RELIABLE-DAYTON FULLY EQUIPPED

will find the one you have is always the worst made—when a salesman for another comes around. Each claims certain points of superiority and each proves that the other is no good. The one that is backed by the best salesman sells for the highest price.

In connecting storage batteries always be sure that the positive pole—marked "P"—is connected to the coil, the negative pole—marked "N" to "ground."

A fruitful cause of trouble is the corrosion of the wires inside the storage battery terminals. The wires should be disconnected every two weeks at most,

dry cells, should be securely fastened in the box, so they cannot shake around or jar out of place. Broken wires and loose terminal nuts are the result of this.

Ninety per cent of the "carburetor" troubles are in reality battery troubles. In driving a car few people realize how many miles they cover in a day in city driving unless they have an odometer to keep them informed. They are, therefore, in the habit of expecting entirely too much of batteries.

A storage battery should be re-charged at least once every two weeks and oftener if the car is driven constantly.

While, with proper care, the life of a storage battery is long, it can very easily be ruined or its charge quickly exhausted by improper methods. For example: A favorite method among garage men for testing the power of a battery is to lay a file, screw driver or other steel instrument across the positive and negative poles. This not only discharges the battery very quickly, but seriously injures the plates by the violence of the discharge. If you have no volt meter and want to test the strength of the battery by "rule of thumb," take a piece of wire a few feet long, rest one end on one pole of the battery and then touch the other-not allowing the two ends to rest for more than a fraction of a second.

A storage battery should never be allowed to remain in the car_after it has

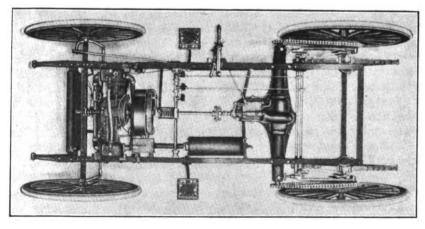


FIG. 1.—A TOP VIEW OF THE RELIABLE-DAYTON CHASSIS

good results as one that has been frequently re-charged. With each re-charging its capacity increases and you will

carefully scraped with a knife and "doped" with vaseline or other grease to prevent corrosion. A good plan is

run down. It should be re-charged at once. Allowing it to stand sulphates the battery and causes considerable injury. A storage battery, when newly recharged should show about six and one half volts on open circuit. When below six volts it requires re-charging.

One cause of deterioration of storage batteries is in the failure of owners to watch the liquid in the battery and see that it does not evaporate until the top plate is exposed. The liquid should cover the top at all times. The liquid is chemically pure sulphuric acid of a density of 11.75. It can be gotten at



A GENERAL SHOP OF LOUISIANA

any garage or place where storage batteries are sold or used.

In connecting up storage batteries always be sure to connect the positive pole to coil and negative pole to ground. If this is done the platinum points on the vibrator will last much longer, as the deterioration will be confined almost entirely to platinum point in the end of adjusting screw, and as the latter is much cheaper and more easily replaced the above instructions should always be carefully observed.

Dry cells should show fifteen amperes when new, not less than twelve. With proper coil adjustment they will work down to about five amperes, although it is unsafe to start on a trip of any length with them below six or seven. It should be remembered that one cell in the set registering less than five amperes will draw the entire six down to its levelin other words, if five cells each show ten amperes and one shows four, four amperes is all you have to go on, and this is insufficient. Dry cells cannot be re-charged-they can only be renewed, and most people consider them not worth the trouble and expense.

In an emergency, however, the following expedient can be made to serve a good purpose. Drill a small hole through the sealing compound on top of each battery and fill them up with water only a few spoonfuls will be required for each. Be very careful not to allow the water to run down the side so as to saturate the cardboard, as the cardboard is an insulation between the negative poles of the batteries. The batteries will then carry about ten miles without further trouble.

Dry cells are uncertain at best and should not be depended on for long trips. A 6-volt, 40 to 60 ampere-hour storage battery re-charged regularly every two weeks will solve battery and nine tenths of ignition and "carburetor" troubles.

In no case should more than 6-volt storage battery be used, nor more than six Columbia Dry Cells. More than this will deliver a spark hotter than necessary and will certainly burn off the platinum points very rapidly and perhaps result in breaking down the coil.

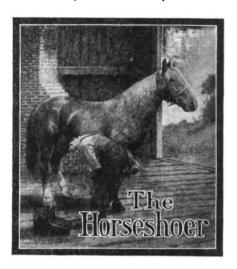
Sparking plugs are so well made nowa-days that they give very little trouble. Every motorist should carry half a dozen extra porcelains to fit his plugs and these can be readily replaced, in case of the porcelain cracking from overheating. Some drivers have a great deal of plug trouble, while others using the same cars and the same plugs claim they "never see a plug." It is unnecessarv to tighten the thumb screw on top of the plug with pliers—in fact, this should never be done, as you are liable to turn the core and thereby open or close the spark gap more than is desirable. Tighten the nut with the fingers just sufficiently so it will not come off and get lost.

In case of a foul plug, and no time to clean or change it, a good expedient is to create a spark gap by disconnecting the wire and, with a string or shred of waste, tie it to the plug so the brass terminal will be about 110 or 312 inch from the plug core or nuts will generally suffice to remedy the trouble, temporarily at least. Speaking of spark gaps: they are undoubtedly efficacious in causing a sooty plug to perform, but they use up twice as much battery current as is necessary without them, so should be adopted only as emergency expedients.

A "miss" in a motor just after starting cold, will usually disappear after a minute or two as the motor warms up. Sometimes only after high speed clutch has been engaged. Usually a "miss" can be remedied by "slowing" the spark—putting lever as far forward as it will go. This gives a long, hot spark

at the points and serves to burn away oil or other foreign matter lodged there. A drop of water—precipitated by quickly cooling a hot motor—between plug points, a drop of oil or particle of carbon can frequently be dislodged by disengaging the clutch and racing the engine a few seconds.

(To be continued.)



Lame Horses and What the Shoer Can Do For Them.—6.

E. H. MALOON.

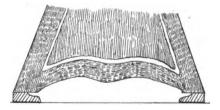
Now to resume the subject that we began to discuss. We left the horse with his foot pared as near nature as we can see it. Now to my mind, as little iron, as you can put on and get the protection you want, is the best. Give the frog pressure if possible and if you want to keep the feet at their best pack them in tar with linseed meal in it to form a thin paste, and cotton or oakum to keep out the dirt.

Right here I want to say something about tar. I see that men who have ointments and hoof dressings for sale here have so much against tar that some horse owners object to using it. My father was a horse owner for fifty years or more and he always used it freely. I have used it very freely since 1867 and have yet to know of any case where anything but good results come from using it. If tar or hot water cost more there would be more of both used about horses. You now know my mind on protection of the foot, also about tar as an agent to keep the foot healthy.

Now, I will try and tell you what I think about the way shoes should be fitted. In fitting flat front shoe I cover all the wall of the foot and no more. You then have the foot and bearings as nature intended. In calking

any shoe have the toe calks where the horse breaks over or wears the foot the most. This helps the horse to a better bearing. If a bar shoe is being fitted cover the foot and no more. If the frog is out of the foot and hard I make the bar so as to give but light pressure. If the frog is soft I give it a good strong pressure. In calking a bar shoe, a good long side calk gives a horse a little better bearing than a short cross calk. If I fit an open-calked shoe I let the calks be low, fit the shoe longer than the wall and mule the heels out as wide as I can. This is not a handsome shoe, but to me an open-calked shoe is an article of torture to a horse, and I take all means to overcome some of its defects and the muled heels will overcome the misery caused by taking the brace away from the horse that is afforded by the wide part of his feet. The best way to prepare a foot for packing is to remove from the sole all that is dead and put your tar on to live hoof. With your rasp remove a little of the extreme point of the heel, so the shoe will not touch by an eighth of an inch at the extreme point and run to nothing in going towards the toe one and one half inch.

This is to bring the weight of the horse on to the frog and the widest part of the foot which is the strongest bearing, the weak heels to carry but a small portion of the load. I now take my tar and put linseed meal with it until it is a thin paste. Next, I prepare a good pad from old belting. I use cotton for packing instead



IS THIS AN IDEAL BEARING?

of oakum. I now spread a good coat of tar on the foot, fill up the crevices of frog with cotton, put on my pad and shoe and I then know that I have done all that can be done for the horse's comfort.

That Ideal Bearing and the Evil(?) of Shoeing.

G. F. STEVENS.

Under the title, "That Ideal Bearing," Mr. Henry H. Failing, Jr., says that he disagrees with my method of setting a shoe, as illustrated in the April number.

He says in referring to my ideal bearing: "The bearing is the same on the inside rim of the shoe as on the outside and, consequently, there is as much weight on the sole as on the wall, which is entirely wrong."

But is it "entirely wrong"? Let us look at the horse in his natural state, for this is really the basis upon which all shoeing for healthy feet should be done. Without shoes the foot carries weight on every part of the ground surface. Now, then, if this is the condition in the natural foot why not duplicate it as near as we can in shoeing? Surely, Mr Failing would not have us believe that a shoe fitted as in Fig. 1 was correct? How, then, does he fit shoes or set shoes to get a perfect bearing? What in Brother Failing's estimation constitutes a natural bearing?

Mr. Failing says he bevels his shoes. Does he mean the surface touching the wall? If so, his principles of shoeing are wrong, according to my ideas and according to every authority to which I can gain access. Invariably you will find the shoeing authorities asserting that the hoof-bearing surface of the shoe should be level. It is understood, of course, that we are talking of healthy feet. It appears but natural that a shoe with hoof surface beveled either in or out will affect the foot. If slanting in the foot will naturally be pinched. and if shoeing is continued in this manner lameness and contraction are but natural consequences.

Mr. Failing further asserts that shoeing is "a necessary evil." His reasons for saying this is the condition of most horses' feet after several years of shoeing. If shoeing is an evil why not dispense with it? Why not drive our noble creatures without the iron shoes? What would happen is only too graphically illustrated every time a customer brings in a horse that has traveled a few blocks over the cobbles after throwing a shoe. What good would a horse be if allowed to travel with unprotected feet? Without shoes a horse would be able to do but a very small part of the work that he can accomplish with them. Without shoes horses would be lame oftener, would have many more foot ills and would naturally require more careful attention than with shoes. The benefits of shoeing are so very apparent that calling it a "necessary evil" is like saying that aeroplanes are impractical after reading what the Wright Brothers have done.

The only evil about horseshoeing is the way the art is practiced by some so-called shoers. A horse shod in the way in which he should be shod is far from being the victim of a "necessary evil." If a horse is shod correctly his hoofs need not be "dry and brittle, with many seams," as Mr. Failing asserts. The frog need not be "dry and hard and very small and sometimes nearly gone." The heels need not be "narrow and contracted." I wonder if Mr. Failing has ever seen a perfect, healthy foot that has survived the shoeings of say eight, ten or twelve years? If he has, and one man has done the majority of that shoeing, that man can tell him a whole lot about shoeing that will interest him (Mr. Failing).

When Mr. Failing described the evils of shoeing he described the results of careless, unscientific, unpractical shoeing as practiced by poor workmen with little knowledge of their trade. I agree with Mr. Failing in that the bar shoe is the best shoe for the foot in many cases. I want to say in closing that a horse can only be shod correctly when the shoer has the necessary knowledge of his trade. He should know the anatomy of the foot at least, and when that is known by every member of the craft. when every man puts his heart and knowledge into the shoeing of man's most faithful friend, then we'll not see any more feet such as Brother Failing describes.

Hot or Cold Fitting.

J. W. JANSEN.

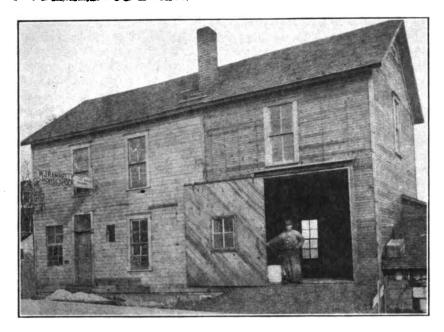
There has always been considerable discussion in shoeing circles regarding hot and cold fitting. Which is correct? seems to be the great question, and there are advocates for both methods.



THE NEBRASKA SMITHY RUN BY BEN ASPLEN

The writer is not going to say just what system he believes, but just wants to ask a few questions.

When a practical vehicle-worker, one who knows his business, fits his ironwork to a vehicle does he put the iron



THE SMITH SHOP OF MR. W. J. RAMMELLE OF INDIANA

on hot? Does he burn a seat for his metal in the wood? Why does the shoer do to the living foot of the horse what the vehicle smith would not dare to do to a piece of wood?

The way you reply—the only answer you can give will tell you which is correct. When one considers the construction of the horse's foot—how it is made up of delicate tissues and organisms—how near the surface some of these are in some feet, one wonders why more horses aren't crippled through careless and improper shoeing.

It may be unnecessary, as one brother wrote a while ago, to have the shoer learn all about the anatomy of the foot and leg, but the shoer who knows anatomy will do a better job of shoeing, will understand the why and wherefore of certain things. How can a man realize the true nature of the foot upon which he works if he does not know something of horse anatomy? How can a man work intelligently upon anything if he does not know the reason for doing certain things. What is your opinion, brother?

Contraction and Quarter Crack.

WM. J. RAMMELLE.

Contraction is caused by improper shoeing. First; by shoeing too wide or too narrow at the heels. Second; by shoeing with high calks, thus raising the frog too far from the ground, so that the frog don't get the proper pressure that nature intended it should have. Third; by the owner allowing the shoes to stay on too long, causing the frog to dry up and not perform

its proper duty in the hoof. My cure is first to trim the feet to the proper angle. Then soak or poultice the feet to make them pliable, shoe with a bar shoe, being careful to give just the proper pressure, and pack the hoof with a good hoof packing of tar and oakum. Use a leather pad and punch the pad full of small holes to let the air in and use only six nails in the shoe, leaving out the heel nails, and change shoes every four weeks.

Quarter cracks result from various causes: Improper shoeing, unbalanced feet and lack of moisture to keep the hoof soft and pliable. A good many treatments are recommended for this disease. Some are mere theories. Others merely artistic designs in horseshoes to show the skill of some blacksmith. Others are practical ideas that perfect a cure and show that a man is a mechanic and master of the horseshoeing trade and not a mere worker of iron.

One theory for curing quarter cracks is to weld a calk just ahead of the crack and to cut away the hoof from the shoe so that the hoof won't have a bearing there. Now, the person using this idea loses sight of the fact that the laminae tissue of the hoof contracts and expands three sixteenths to one fourth of an inch every time the horse steps. Consequently, instead of the hoof staying away from the shoe as is intended in this treatment, it springs down to the shoe and causes the crack to spread farther up and not heal.

Another pet idea some men have is to burn or cut a notch on each side of the crack and put in a nail crosswise of the crack and clinch. This works sometimes, but it is a dangerous undertaking, for you are liable to pierce the sensitive laminae and do more harm than good.

I have had more success with this ailment by paring the hoof level and getting it well balanced, which is the foundation of all good horseshoeing. Then make a bar shoe as light as the horse can conveniently wear, make the bar as wide as possible and give good frog pressure. Relieve the heel on the side of the hoof where the crack is and raise the heels of the shoe by welding on side calks to relieve the back tendons. Then with a sharp knife cut out on each side of the crack as deep as the horn to relieve the pressure on the sensitive laminae. Then take a thin, sharp, piercing iron made for the purpose and fire across the crack at the top of the hoof at the coronary band as deep as the sensitive laminae goes. Change the shoe every three weeks and you will never fail to effect a cure, if the horse owner will do his part in getting the shoes changed.



Locating the Rub Iron.

NELS PETERSON.

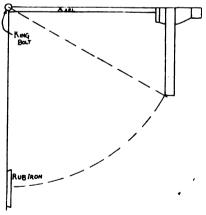
If Mr. Worasek had stated whether the rub iron was to be placed on the body or the reach it would have been easier to give an accurate reply, as the two cases are different. In the case with the rub iron on the reach it is easy enough. Just draw a line from the kingbolt through the axle to a point on the spindle in a plumb line with the rim. Another line from this point on the spindle to the edge of the tire and at right angles to the first line. Now, if you have a four-foot eight-inch track and a 36-inch

wheel in front, your lines will represent a right angled triangle with one side two feet four inches and the other side eighteen inches. And as the square described on the hypotenuse of a right angled triangle is always equal to the sum of the squares described on the other two sides it follows that if the squares of the two sides are added together, and the square root taken of the sum, you will have the length of the hypotenuse or, as in this case, the length from the kingbolt to the rim of the wheel. But you can probably find the distance much quicker by simply drawing the lines on a blackboard or on the floor of your shop as in the engraving and then measure the distance between the two points. The wheel will always strike the reach the same distance back from the kingbolt as the distance is from the kingbolt to the rim. distance depending upon the width of the track and height of the wheel.

How to Temper Springs.

R. E. STEPHENSON.

• This method of tempering springs is much cheaper, cleaner and more satisfactory in every way than any that I have seen or heard about. I heat the spring in an ordinary fire, shape it up and leave it for the helper to cool off with compressed air with a one fourth pipe in the end of the hose. I have done all sizes this way from small coil springs to large automobile springs,



LOCATING THE RUB IRON

over 4 feet long, of 2½ by %-inch stock and put them to the most severe test and have not had one go back on me yet, and there are more than one hundred in use that have been done this way. A simple device could be made so that the helper could do all, but we don't have enough of it to do to justify us in working up a fire in the furnace, so the helper can cool them while the blacksmith

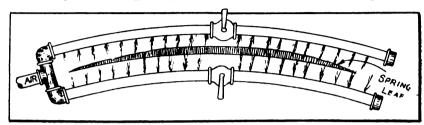
heats others. The engraving shows a device that could be used for large numbers where they can be heated in a furnace. Any boy or helper could do it, as the heat is not so important as when tempering in any of the old ways.

Well Drilling Tools.

L. R. SWARTZ.

An Australian friend wishes to know "How drilling jars may be made for an artesian plant." In general, there

of jars are square-link jars, pole-tool jars, piston-link jars, self-turning jars and round jars. Except the pole-tool jars drilling jars are made "short stroke," i. e., from four and a half to eight-inch stroke. Pole-tool jars and fishing jars are made "long stroke," from fifteen to 36-inch stroke. Most jars are now made of steel, but some, those principally used on pole rigs and fishing jars, are of iron and steel lined. Round steel jars are considered the best and strongest for all



THE VALVES SHUT OFF THE AIR FROM HALF OF EACH PIPE

is no difference in the kind of jars used for water-well drilling, oil-well drilling or for the drilling of artesian wells. There are, however, many sizes of tools ranging in size from two and a half to fourteen or eighteen-inch tools in use in the United States; the larger sizes being more commonly used for drilling holes in which are operated the pistons of hydraulic elevators.

Oil-well drillers on the Pacific coast favor the larger sizes. The standard size of tools is that made with tapered joints the pins being three inches at base and two inches at top and four and a quarter inches high and are used on tools ranging in size from five to six and a quarter inches. The standard size of bit being five and five eighths inches. Some makers make three sizes regularly, known as small, standard and heavy, governed by the size of the pins. Small size joints are one and five eighths by two and a half inches; standard size joints are two by three inches; heavy size joints are three by four inches. All are cut with V threads, eight turns to the inch. The outside diameter of the two by three pin collar is four and a quarter inches. It is usual to make the box a trifle larger in diameter than the pin collar. This increase in size is called the "bead."

As to jars there are many sizes and kinds in use, the purpose being to make the jars three eighths to one-half inch smaller than the bit so that the jars also act as a winged substitute in keeping the stem straight and steady in the hole thus insuring a straighter bore. The principle kinds

around use, because that shape gives the greatest amount of metal in the reins and heads where the wear and strain is greatest.

Piston jars and square link jars are not much used and most makers have discontinued making them. Self-turning jars are used most on machines rigged with wire rope instead of regular Manila drilling cable. They are certain in their action in turning the tools at every stroke, but are not so strong as the round steel jars. They have the advantage of not getting locked by stones getting into them. Piston jars are a sort of "freak" and have no advantage over other kinds.

Owing to the severe strains to which jars are, of necessity, subjected, it is no wonder that they have been the subject of more painstaking effort on the part of manufacturers and inventors than any other part of drilling tools proper. Even in a clear, true hole with the tools running smoothly under tight cable the concussion caused by the rebound of the stem and bit and the whip-like spring of the cable is no slight matter. But where the bit gets to sticking or the tools are binding in a crooked or uneven hole and the cable head has to be run slack to allow the links to play so as to set up a vibration in the stem to loosen the tools, the strain is enormously increased and it requires the best material and workmanship to produce tools that will come out safely.

Unless one is equipped for the making of heavy forgings the best way to make jars is to send your order to some manufacturer who makes drilling tools a specialty and who has a good reputation at stake. The best makers do not guarantee jars except as to material and perfect welding.

Anyone interested in the business of furnishing heavy jars and desiring a list of makers of the best standard tools may write the author, enclosing postage.

Still, for the benefit of any who wish to try their skill at making jars, I will give some plans and such drawings as I deem necessary to explain the matter. They may then adopt the course most suitable for their facilities. In the first place one must know the size of hole the jars are to be used in. While there is some latitude as to the size of bores in which a pair of jars may be used, it is best not to allow for more than five eighths of an inch. i. e., 5-inch jars for 5\(\frac{1}{2}\)-inch hole. The length of stroke depends upon the kind of machine and whether a sinkerbar is to be used between jars and rope socket. The cross section of a pair of good jars where the heads meet should represent almost a solid bar; just enough room to allow them to work and no more. The striking surface should form a square just a little more than one third the diameter of the jars, else the heads will wear away too fast, or if drilling in sandy rock with a sharp grit they will wear to a knife edge and soon cut out.

Note.—Mr. Swartz's address can be procured from the Editor by anyone interested.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants to make a Blow Terch.—I wish some brother smith would kindly give the details of how to make a gasoline blow torch.

F. E. Sharp, Kansas.

A Concrete Engine Bed.—Will some brother tell me through the paper how to build a concrete bed for an engine? I have an eight-horsepower engine and I want to build a concrete bed for it.

W. H. TEDFORD, Tennessee.

That Shoeing Problem.—Referring to the discussion about the price of shoeing a horse at one cent for the first nail and double the price for each succeeding nail I saw a little pamphlet which gives the answer as \$42.949.672.95.

P. P. GREENE, Oklahoma.

Shoeing for Drop Sole.—I would like to have some good brother tell which is the right way to shoe a foundered horse whose sole has dropped down. A flat heel shoe with a toe or a calk on the heel and not any toe. My experience is to keep the heels down as low as possible.

ASA FANCHER, Connecticut.

Several Questions.—I should like to hear from my brother craftsmen about how best to fix top and bottom fullers and top and bottom swages, also how to fix old buggy tops. I would also like to have some brother smith tell me through "Our Paper" how to make a home-made slitting shear, and a tool with which to pare hoofs. G. J. H. FIERIKS, Minnesota.

A Big Job.—I would like some brother smith to tell me through The American Blacksmith how to make a good job of repairing an engine fly wheel that has a spoke broken about three inches from the hub. I have never done a job of this kind, though I have brazed many small jobs. The wheel is about four feet in diameter and weighs about six hundred pounds.

A. G. Roberts, Australia.

A Device for Pulling Spokes.—I saw in the January number a device for pulling spokes. I think I have one that beats it. First, have an oval ring made of 1/2 inch to slip on the spoke. Then take a wedge on top of spoke driven from toward the hub with heavy hammer. This is a very quick and handy way of pulling spokes and very seldom fails. I like The American Blacksmith; it helps me in my work.

H. D. WHITE.

To Drill Mould Boards.—I wish that some brother smith would tell me how to drill a mould board which is chilled cast iron. How can I soften it so as to drill it?

C. A. GARY, Ohio.

In Reply.—Heat your mould board to cherry red and then place upon the part to be drilled a piece of brimstone about the size of a walnut. Allow this to melt and the mould board may then be drilled in the regular way.

L. G. S., New York.

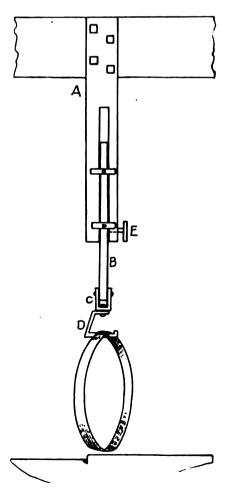
Level Shoeing.—In your May number I noticed an article written by Joseph M. Jones, of Ohio. on shoeing ankle hitters and I agree with him. All horses should be shod level. But what about the Ohio man that drove on one hundred and thirty-six shoes in nine and a half hours? I am of the same opinion as Brother R. R. Wolford, of Ohio. How does he do it? I'm afraid they were not all level. I wonder if the brother went fishing the night before. Chas. E. Sharp, New York.

A Handy Tire Holder.—In answer to Louis Lau, of Illinois, on how to make an anvil tire holder, I have one which 1

invented and made and used for years. and it gives perfect satisfaction where the smith has no helper. The dimensions are as follows: The piece A is of wood two and a half by four and a half inches, of any length to suit overhead arrangements. It has a slot one and a quarter by three feet sawed from the lower end up. A sliding piece B is made to fit the slot and is of a length to suit with a clevis C riveted to lower end. This clevis is made of one quarter by one inch and carries a hook D which holds the tires. Piece B slides up and down in slot and is held by set screw E. I think this device will suit Mr. Lau.

C. C. PARIS, Ohio.

A General Shop of Quebec.—I like The American Blacksmith and would not like to be without it, as there is lots of useful information in it. I will give you a description of my shops. The blacksmith shop is twenty-four by thirty-six, with an L for wheelwright's shop thirty feet square. The first story is for workshop and machinery with paintshop overhead and an engine room twenty by thirtysix, and woodshed at the end of workshop. I use a twelve horsepower steam boiler and engine. I have fifty-two feet of line shaft from which I run my drill, iron lathe, threading machine, buzz planer. surface planer, band saw, wood lathe. emery wheels, rip and cut-off saws, tenon machine and hub-boring machine. I have two Royal blowers in blacksmith shop, a tire roller, a tire shrinker and a good



A HANDY TIRE HOLDER



assortment of small tools. I build wagons and carriages and do general repairing and horseshoeing. I have been in the business about twenty-five years and always have plenty of work. Joseph Gamble, Quebec.

A Wisconsin Power Shop .- I find THE AMERICAN BLACKSMITH a very interesting paper and the longer I take it the better I like it. My shop is twenty-four by sixty feet. I have a two-horse Fairbanks-Morse Gasoline Engine, a rip and cut-off saw, an emery wheel, two drills, a Royal blower, a set of Little Giant taps and dies and all other tools to run a complete general shop. I do every kind of work that comes along and keep a helper the year round. I sell farm implements for a side line. Prices are somewhat lower here than in other places. I started at the trade in '89 and have been here in business nine years, and in that time I have used the Phoenix horseshoes and the Capewell horsenail and I find none R. F. ZIEHM, Wisconsin.

A Letter from Washington State.—I do a general blacksmith business. At present work is rather dull, but I have all I can do ordinarily. I don't have much horseshoeing to do. My work is mostly farm work, such as repairing machinery, wagons and vehicles and plow sharpening. Prices are reasonably good. I notice some of the brothers' prices for furnishing stock and doing the work is not as much as our material costs us here in this country. I wont give you any of our prices in this, but may in another letter. My shop is twenty-two by thirty with a twelve-foo wall. My tools consist of an International Engine, a trip hammer, an emery stand, a power drill, a hand drill, a power blower, a hand blower, two anvils, a tire shrinker and plenty of anvil and other tools.

C. G. Fuller, Washington. Wants a Light Plant.-I have a fairly good business among farmers, although these are awful dull times. But when there is any business I usually get all I can do and sometimes more. As I work alone my prices are good, but am trying to increase my business, so I can keep a man as I have lots of work that is too hard on one man alone. I want to say to the Editor that I am in favor of having our paper published twice a month. I feel sorry for Mr. Harebo, of Wisconsin, but would advise him to stay right by his old man's side and do good work and everything will come out all right after a while. Also stick to your prices. I would like to ask the brothers if they can tell me of a good light plant for shop and hall use. Will say that I get much good information from THE AMERICAN BLACKSMITH. W. H. LEHMAN, Ind.

The Ball with Square Hole.—Replying to Henry Berg in the May issue with regard to the size of square hole to be mortised in a ball twelve inches in diameter that will contain one third the ball's contents. I want to tell him that a hole 5.016-inches square will hit it so close that he couldn't tell the difference in the weight, and the remainder of the ball would weigh just twice as much as the part. To get the cubical contents of a ball any size, cube the diameter and multiply the result by .5236. In this case 12 by 12 by 12 by .5236—904.78 cubic inches, and 904.78

∴ 3 = 301.59 cubic inches to be removed.
 "Well," you say, "what has that to do with the size of the hole?" To find the area of the cross section of a block twelve inches long containing 301.59 cubic inches, divide 301.59 by 12 = 25.13 square inches. And the square root of 25.13 is 5.016 inches, very nearly the exact size of the hole.

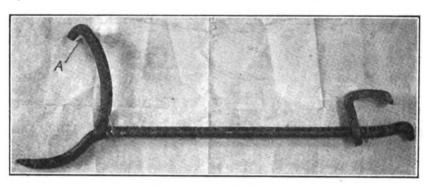
Nels Peterson, Nebraska.

A Letter from The South.—I have been running a shop here for four years, I am getting all the work I can do and keep another smith most of the time. I make a specialty of shoeing. I have a tenhorsepower gasoline engine, and a grist mill and feed crusher as one of my side lines. I also have charge of a Standard Oil tank here and hire a driver who helps in shop and mill when he is not on the road.

like them. They are the favorite shoe over here. I think the majority of farriers use them. Of course, the heavy draft horse shoes are generally hand made. When I was serving my time we made all our shoes; racing plates out of spring steel. Things are much easier now than they were in the trade twenty years ago. Another great help is the hoof parer.

W. J. MEARES, Natal.

On Shoeing.—I have read the article on fast shoeing by Mr. Deremer, of Iowa, also the comment by Mr. Wolford, of Ohio. I agree with Mr. Wolford about the guessing, but maybe we are mistaken in the time. Probably Mr. Deremer meant that he drove one hundred and thirty-six shoes against the wall; it would require only two nails to hold each, and besides he would



A SIMPLE AND EASILY MADE PLOW-BOLT HOLDER

I do not read your paper, I study it and would not be without it for anything. I have had bad luck lately; my barn burned, and then I was criopled for nearly a month by a bad mule. So I am badly behind, but I must have my paper if I do without something to eat, as your paper must be bread and meat for my children.

This place has a population of five hundred. There are two general blacksmith shops, one machine shop and one foundry which does general blacksmithing. But by the help of The American Blacksmith I get all the shoeing I can stand up to.

Charles P. Johnson, Alabama.

A Plow-Bolt Holder.—The engraving herewith shows a plow-bolt holder that is the best we have ever seen. There is a lug at A on the side of the hook that does not show in the picture. This lug allows the holder to hook on the land side of the plow on any bolt anywhere. The hook attaches to the mould board and the other end gets the share. This device is a good one.

S. J. Pemberton, Kansas.

From South Africa.—I like the paper very much indeed and I find it very interesting. I am a farrier by trade. I have been at it now since 1886. I was in business for twelve years on my own account until nearly four years ago, when I sold my business on account of bad times, which I am sorry to say we still have. But I was rather fortunate, for, ten days after I sold out, I was asked to join the Natal Police as Farrier Sergeant, which I did and have held this appointment since. I should like to say that for the last fourteen years I have used the American Cowboy shoes and

not need to dress or level them. I think we have a half brother of Mr. Deremer here in this town who learned his trade first in a brick yard, then went to Lion City, Iowa, now he is here butchering steel, iron and horses' feet. I pity the poor horses. I wish you would see them after they were shod. Now this is the way he does it: He lets the heel grow, cuts down the toe and then he puts 1-inch calks on his shoes. You can see that this kind of shoeing is of no advantage, but damaging to a horse. The consequence of such trimming and shoeing is that the horse will be crooked in his knees, also that he will have what I call a "buck" hoof. I think that a man like that ought to learn his trade. H. H. KNOLL, Oklahoma.

A Letter from Connecticut.—I sometimes think my time is so taken up that I don't get quite all there is in the paper, but I get all I can. There are good instructions in the line of blacksmith work and also in the line of automobile work. My experience in automobile work has been slight, though I own one myself and I take care of it and do my own repairing. I have not yet got stalled, so I could not find a way to straighten out any trouble and remedy it. I took out the valve cages, ground the valves and repacked the cages and adjusted the carburetor. Have looked at the timer and found out that all things worked to perfection. If there is trouble in the cylinders, if they skip the explosion, it is due to something, sometimes too rich a mixture, sometimes not rich enough, sometimes the valve lets in air or the packing is not good around the valves cages, sometimes due to the coil, sometimes the battery. Last Sunday I found the storage battery was weak and I had

to use the dry battery. Now, experience, along with The American Blacksmith, will soon benefit a man so he can make repairs and not make a failure.

I have been shoeing a horse that had a separation around the toe of one foot. I could shove a number-nine nail up the whole length. This made its appearance as follows: The foot sounded as though it was hollow, and after a shoeing or two in cutting down I came to the hollow, the separation. If I am not mistaken I saw in The American Blacksmith that a craftsman to get rid of this trouble took the horn off down to the separation. I don't think in this case that this would work, but I do think the old horn and the new growth should be separated at the hair. ASA FANCHER, Connecticut.

A Nebraska Shop.—We built this shop last year. It is of concrete blocks, while the floor is cement, except the shoeing floor which is planked. We have all the work that we can do the year round. Have been here for thirteen years. This

and some other work, about twenty-seven dollars' worth of business for Saturday afternoon. I don't know what the other work was. I suppose he ironed up a log wagon or two.

Well, I thought I'd tell what I could do and said I could trim the feet, fit the shoes and shoe one horse in fifty minutes. I went around Monday morning and peeped in the shop door and while he was burning a fit I had time to look at my watch without his noticing, for I could hardly see him for the smoke. But I got tired and went away and forgot to look at my watch. Now, if Mr. Wolford could happen around to Mr. Deremer's shop some time and procure an outfit consisting of a baseball mask and some football pads, high-topped boots and automobile goggles and then step in and watch things fly, he might not forget he had looked at his watch.

Now, as to hot and cold fitting, I have failed to see any article that thoroughly explained what I call cold and hot fitting.



A NEBRASKA GENERAL SHOP BUILT OF CEMENT BLOCKS

is a farming and stock-raising county. Our town is only four hundred inhabitants and we have three shops here, all good ones, and we are all the best of neighbors. Prices are good, for we have all we can do, so there is no use of working cheap. I read The American Blacksmith and several other journals, but I like The American Blacksmith best. We find lots of helps and kinks that come in handy.

GEORGE F. MILLS, Nebraska.

Shoes and Shoeing.-I am always looking forward to the journal and generally read the letters first. I notice the boys are still pounding Mr. Deremer, of Ohio, for his swift shoeing. Well, I thought the same as they do, but thought I'd wait and let some one else kick first. I stopped in a good little town in the Flathead Valley, Mont., when I came out here and went to church on Sunday morning; the sermon was on "Economy." I introduced myself to the preacher and he introduced me to the blacksmith. Think of a blacksmith getting a sermon on economy and then telling all he could do at one time to just one man!. This smith said he had fitted up and nailed on sixtyseven shoes before noon, but was feeling fine. Another fellow said he had put on forty odd on a Saturday afternoon, and, of course, a fellow is tired then; and there isn't so much expected of him. First he stayed late at dinner, so got a late start, but he shod six horses, set five wagon tires, made a heavy wagon brake complete

What I call fitting is welding on toe calk and turning heels to fit around the wall of the foot. That is what I heat my shoe for. After I get the shoe fitted around the wall of the foot I then level the shoe and let it cool. I do the rest with knife and rasp. I do not burn a level surface on the foot. So if leveling the foot is what any brother calls fitting, I am a cold fitter and if he calls the former fitting I am a hot fitter.

Now, I have a question. I had a tire to set, the wheel was dished four inches (buggy wheel) the rim lacked one quarter inch coming down on about half the spokes. Did I have to shrink the tire or splice it? Of course, I put in new hub rivets and straightened the wheel as much as possible and left about one-inch dish.

I enjoy all the letters, but can't see how the Georgia smiths can keep up at their prices. I agree with J. M. Jones, of Ohio, on shoeing level. Would like to hear from some of the Indiana boys. They know who I mean and they can tell tales, too, and are good workmen. If Mr. J. A. C., of Massachusetts, knew how little I know he would seek better advice. However, I am glad my letters are noticed and I appreciate any and all of the letters, even the kickers. It helps me to guess how they look and what they know. When a fellow knows nothing but to kick, you know about what he looks like. W. H. Chambers, Washington.

A Letter from Mississippi.—I am a blacksmith from choice. I tried many other ways of earning a living, but my health was poor. Several doctors advised me to try blacksmithing: so I served as an apprentice for four years after I was twenty-eight years old. I then determined to go into business for myself. I came to this town for mere curiosity, worked a month for a man and learned it was a clean, good town with Christian people at the head. I also learned that the best people had very little confidence in a blacksmith. The very man I worked for was to blame for this, and while he was considered the best blacksmith that had ever been in the town yet, when Saturday night came, he loaded up on whiskey, spent his money foolishly, and did not carry enough home to dress his family. Sunday he loafed around the corners of the town abusing and hating every respectable man he saw and claiming they got their good clothes by cheating him..

At that time he was renting. I went in on half partnership with him and in eight months we had a shop of our own. Finally, I proposed to buy or sell and he sold. Today I could sell my shop and outfit for \$1500.00. I have also built myself a modern home worth \$4000, but I lack \$1000 of having it paid for.

For the first year or two at this place, men would stop me on the street or at my work and say, "You don't act like a black-smith and you surely do not dress like one. You must have brought money here with you." Many other things have made me more determined to elevate my work and to make a success of it and I worked hard.

I write this to give you some idea of how some blacksmiths act and keep the trade in disrepute, and the man I worked for and began business with is still traveling to find a good place to locate..

THE AMERICAN BLACKSMITH stimulates me to try harder. It encourages the craftsman to make a respectable citizen of himself. We need more than money to live the right life and you know how to tell one about it.. I read every bit of your dear paper and profit by it, too.

R. L. W., Mississippi.

An Interesting Letter from South Dakota.—I have taken the paper for but a short time, but like it very much. It helps to raise and uphold prices and both are what we need badly here. Our prices are as follows:

Resetting	
New Shoes	. 50
Wagon Tongue	4.00
Wagon Axle	4.00
Spokes	. 25
Rimming	1.50
Setting Tires\$.50 to	1.00
New Buggy Tires	7.00
New Wagon Tires	8.00
Automobile Work, per hour	. 60

(Material used extra.)

I do no woodwork now as horseshoeing takes all my time. Last winter I sold my wood stock and now devote all my time to horseshoeing and plow work—these keep me busy.

My shop is twenty-four by thirty-two feet with an eight-foot wall on a concrete foundation. I have a Royal H Blower, a Hay-Budden anvil, use United States horseshoes and drive Capewell nails. I

have most all of the dray and livery trade and never lose a shoe. I use Acme pads. Put on a long shoe the same as when I use no pads. I cut the high heel off where the shoe goes. This leaves the pad about one-half inch thick under the shoe. The heel calks I sharpen harrow pointed for pads and let them stick below the high center rubber about one quarter inch. I have yet to find the first horse sore in the heel that this method did not cure. If the foot is contracted I put the pads on in the same way except that I weld a piece of hoop iron about three sixteenths by one and a fourth inches on the shoe. This is so placed so it will be on the bottom of the high rubber center. I punch one extra nail hole in the shoe at the heel. I have cured up horses all the way from ten years old to 16 years that had suffered with contraction for years.

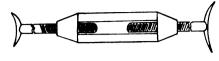
By the way, if that Wisconsin brother is in the shape he says he is, I know just how he feels. I was in the same boat myself last January. I am just a young smith and have started in for myself. I worked for a brother smith in this town for a year. We could not get along on shoeing, so I made up my mind to start for myself. He said I was foolish, for he had been at the trade for eighteen years while I had had only two years' experience. He said that he would run me out of town in six weeks. I did not have over sixtveight dollars when I started, but the hardware man said he would trust me for tools if I would pay freight. I also got trusted for lumber. I built the shop myself on rented ground. The shop was sixteen by twenty. A month ago I tore down the old shop, bought a lot twentyfive by one hundred and forty feet and put up a new shop and built a house. I have everything now paid for but one hundred and seventy-five dollars and just recently saw my brother smith, with his trunk, leaving town.

If Mr. Harebo will do as I did he will be well paid. When any of your brother smiths customers come in to have you do a job use them fine and dandy, tell them a little story and ask them to come and see you whenever they come to town. When they say anything about your competitor never say anything, but stick to your prices. If they should stop and want a bolt or two do not charge them for it. Bolts do not cost much and in a short time you wil have dollars where you gave away cents. Try it, brother-it won't do you any harm anyway. I would like to hear from some one that has a good two to four horsepower gas engine and a grinder and a lathe and a trip hammer that they want to sell. W. J. Boyd, South Dakota.

A Spoke Tool.—Take two half-inch turnbuckles nine inches long with threads through each end; one right hand and the other left handed. Then take two pieces nine inches long of ½-inch iron, cut a right-hand thread on one and a left-hand thread on the other rod of same length. Then weld a ½-inch piece on the other end about five inches long, bend to a circle to fit to buggy hub. Weld another on the end of the other rod and form in a circle to fit the felloe. Now put them together. Have two of these tools. Now place large end on the hub and the other

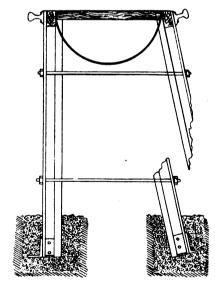
under the felloe, turn the buckle and raise the felloe to the desired height, put spoke in place and loosen buckles and you have a neat job without marring felloe.

J. C. Sigsby, Michigan.



A HANDY SPOKE TOOL

A Question on Structural Work .-- I see so many wonderful things described and explained in The American Blacksmith. Some articles are very useful to me, some may be of more use to others. But I will be very thankful if you can give me good advice on an irrigation scheme. There is a furrow five miles in length, two feet deep and four feet wide. In some places it is necessary to carry the water over depressions of various depths. One place is one hundred and seventy feet in length and as much as twenty feet at the deepest place. If I had been on this place before the furrow was started I should have advised to lay pipes instead. The material I have to work with is all here and consists of railway rails four by three and a half by thirty feet for standard and rails; timber three by six inches for lining the rails and stays across the bridge and galvanized sheet iron six by three feet. The latter have to be riveted, soldered and covered with the lining on the rails to carry the water. I don't like to do the thing and then have it come down with the first storm or rain and I



A QUESTION ON STRUCTURAL WORK

have not seen articles on construction of this kind in our paper, although bridge building should be a very considerable item. In the drawing the standards will have to be slanting for the required strength and I consider the cross-ties the most convenient, because there is very little room here to fasten on the rails. The sheet iron will be laid over the lining timber about three inches and nailed or screwed on.

Otro Tietz, Natal.

A New Mexico Price List.—There are but two shops in this town and we have gotten together and agreed upon the following prices:

prices:	110 W	****
Shoeing List.	e 2	Λ.
New shoes, 1s and 2s, per span	\$ 3	. 00 . 50
New shoes, 3s and 4s, per span New shoes, 5s and 6s, per span		.00
Reset old shoes, each		. 2
Make bar shoe, each		. 7
Make toe or side weight shoe, each	_	. 7
Shoeing stallion		. 00
Shoeing where ropes are used, extra.		. 00 . 2
Paring horses' feet, per horse		. 2
Wagon Work.	\$. 50
End irons for bolster, per pair Stake irons, each		. 50 . 50
Bolster plate, each		. 00
Sand board plate	1	. 00
Reset 4 tires, per set		.00
Reset 4 tires, over 2 in. wide, per set		.00
Reset tires less than full set, each		.00
Putting in California rivets, per wheel. New rub irons, each		. 2. . 3.
New tongue cap on tongue, each		. 60
New hammer strap, each		. 3
New queen rod, each		. 3
New king bolt, each		. 50
New wagon wrench, each New hub band, each New seat spring, 2 leaf		. 50 . 23
New seat spring 2 leaf		. 2: . 8:
New seat spring, 3 leaf		. 00
New box rods, each		. 28
New center clips on singletrees, each		. 2
New ferrules, each		. 15
New seat hooks, each	3	. 18 . 78
Make pair stretchers	3	7:
Put in axle for 2\frac{3}{4}-in. wagon, each		00
Put in axle for 3-in. wagon, each		00
Put in axle for 31-in. wagon, each	7.	.00
Wagon tongue, put in		.00
Wagon box, bottom bed	16.	00
Wagon box, top and bottom bed	13.	50 50
Wagon box, top and bottom bed New wagon tire, ½x1½, per set put on New wagon tire, ¾x1¾, per set put on	17.	oc
New singletree hooks, each		20
New spokes, each		30
New felloes, each		30
New tongue hounds, each		$\frac{25}{00}$
New front hounds, each		50
Wagon box bottom, 1-in, flr		00
Wagon box bottom, 1-in. flr Wagon box bottom, 11-in. Texas pine		00
Buggy Work.		
New buggy body	\$10.	00
New pair shafts New pole complete, without yoke	6.	00
New pole complete, without yoke	8.	00
Put in pole		50 00
Spring barSpokes, singly, each		30
Half rim		00
Buggy reach, straight	1.	5 0
Buggy reach bend		00
Buggy or spring wagon doubletree,ea.		25
Singletrees, each		00 50
Axle bed		50
Shaft put in		25
Cross bar		25
Pole circle		25
Set 4 tires	3.	
Set less than 4 tires, each		00
New stubs up to 1 in.,double collar		00 0 0
New stubs up to 11 in.,double collar	9.	
New stubs up to 1½ in.,double collar	10.	
Concord, 11 in., double collar	13.	
New buggy tire, $\frac{1}{8}x\%$, per set	8.	
New buggy tire, $1 \times \frac{1}{16}$, per set New buggy tire, $1 \times \frac{1}{16}$ x $\frac{1}{16}$, per set	9.	
New buggy tire, $1\frac{1}{4}x\frac{9}{16}$, per set New buggy tire, $1\frac{1}{4}x\frac{3}{4}$, per set	9. 10.	
Weld buggy spring		00
Weld shaft and pole irons, each		50
Weld on shaft eye		50
New pole irons, per set		50
New axle clip, 5/16, each		2 0
New spring clip, each		30 30
Singletree clevis, each		30 60
Hammer strap		35
F		



Singletree hook \$.15	Neckyoke, new irons\$1.00	Shaft cross bar\$1.00
Set spring hooks, per set 1.25	Neckyoke, old irons	Shaft ends
Clip king bolt	Neckyoke, center	Shaft braces, per set of four
Weld reach irons, each	Neckyoke ends, each	Spokes, each
Rivet bow socket	Queenbolt	Spring bar, plain
New bow socket	Rims, inch and three quarter tread 8.00	Stubs, 7 ths or 1 ths 7.00
Plow and Machine Work.	Rims, half inch and three quarter tread 1.00	Stubs, one inch 8.00
	Sand board 1.75	Stubs, $1\frac{1}{8}$ inch 9.00
Sharpen plow, each \$.25	Setting box in wheel\$.50 and up	Stubs, 11 inch
Sharpen plow and point, each	Single trees and double trees each 50 and 75	Stubs, $1\frac{1}{2}$ inch and up\$12.00 and up
Make new lay 3.25 Make new landside 1.25	Setting skeins	Setting box in new wheel
Sharpen 4 cultivator shovels	Spokes, new, each	Setting box in old wheel
Sharpen large single shovel	Spokes, redriven, each	Tires, set and bolted 2.50
Put in new plow handle 1.00	Seat hooks, per set	Tires, new \$8.00 and up
Put in new round	Singletree centers, each	Wheels, new, each 3.00 and up
Sharpen road plow		Wheels, new, per set12.00 and up
Sharpen and point road plow 1.50	A CONTROL OF THE PROPERTY OF T	Whip sockets
New plow beam		Plow Work.
Repair chain, per link	THE RESERVE OF THE PERSON OF T	Beams, straightened\$1.00 and up
Make grab hook	CONTAIN	Beams, new, wood
Weld sickle		Coulter, fin new
Put in new piece		Coulter, sharpened
Put on new sections, each		Coulter, clevice
Make wood pitman, each	· 自然是一种 10 10 10 10 10 10 10 10 10 10 10 10 10	Cultivator shovels, pointed, per set 2.00
Weld iron pitman		Cultivator shovels, sharpened, per set .50
Sharpen harrow, 60-tooth 1.00		Cultivator shovels, sharpened, six in set 60
McGee & Rathjen, New Mexico.		Cultivator tongues, short end 1.00
A Price List From Kansas.—We have a		Cuitivator tongues, hard wood 2.00
shop that measures twenty-four by sixty		Discs sharpened, 12 and 14 inch, each .25
feet, and have a six-horsepower Fairbanks-		Discs sharpened, 16 inch
Morro gos angino a shanar a tria harras		Discs sharpened, 18 inch
Morse gas engine, a shaper, a trip-hammer,		Discs sharpened, 20 inch
a rip saw, an emery wheel, and we run two	SECOND CONTRACTOR OF THE PROPERTY OF THE PROPE	Disc plow
fires. We have formed an association in		Disc tongues, pine
Mitchell County and have adopted the	A SHIP SMITHY IN AUSTRALIA	Disc tongues, oak 2.50
following price list:	A Carrie Carrier at 1100-1-1-1-1	Drill shoe, sharpened, each
Horseshoeing.	m:	Handles, plow straight, each
New shoes up to No. 5, each\$.40	Tires, reset\$2.00	Handles, plow bent, each
New shoes up to Nos. 5 and 6, each50	Tires, reset and bolted 2.50	Lays, new, 12 inch, crucible cast 3.00
New shoes up to No. 7, each	Tires, reset, three inch, per set 3.00	Lays, new, 14 inch, crucible cast 3.00
Old shoes reset, each	Tire, one only, set and bolted	Lays, new, 16 inch, crucible cast 3.50
Bar shoes, plain, each50	Tires, rake, reset, each	Lays, for fitting factory lays 1.50 Lays for listers, new\$3.00 and up
Bar shoes, calks, each	Tongues, new, complete 6.00	Lays, breaker, 14 inch
Shoeing vicious and draft horses, extra 1.00	Tongues, old irons \$ 3.00 and up	
		Lave brooker 16 inch 9.75
	Tongues, complete, old iron 5.00	Lays, breaker, 16 inch
Trimming feet	Tongues, caps	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps	Lays, sharpened, 14 inch .25 Lays, sharpened, 16 inch .30
Trimming feet	Tongues, caps. .50 Tongues, cross piece .25 Wagon box seat .2.50	Lays, sharpened, 14 inch .25 Lays, sharpened, 16 inch .30 Lays, lister, sharpened, with sub soiler .50
Trimming feet	Tongues, caps. .50 Tongues, cross piece .25 Wagon box seat .2.50 Buggy Work.	Lays, sharpened, 14 inch .25 Lays, sharpened, 16 inch .30 Lays, lister, sharpened, with sub soiler .50 Lays, lister, pointed and sharpened .100
Trimming feet	Tongues, caps. .50 Tongues, cross piece .25 Wagon box seat .2.50 Buggy Work. Axle beds, each \$1.25	Lays, sharpened, 14 inch
Trimming feet. 25 Fitting up four new shoes. 1.00 Fitting up four old shoes. 75 Wagon Work. Axles, 3½ x 4½, hickory. \$3.50 Axles, 4 x 5, hickory. 4.00	Tongues, caps. .50 Tongues, cross piece .25 Wagon box seat .2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00 Body corners, tin, per set 1.00	Lays, sharpened, 14 inch
Trimming feet. .25 Fitting up four new shoes. 1.00 Fitting up four old shoes. .75 Wagon Work. Axles, 3½ x 4½, hickory. \$3.50 Axles, 4 x 5, hickory. 4.00 Axles, skeins, cast. \$8.00 and up Box, wagon box, complete. 18.00 Box, wagon box, extra top. 5.00	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00 Body corners, tin, per set 1.00 Body sides 2.00	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00 Body corners, tin, per set 1.00 Body sides 2.00 Body ends 1.50	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat. 2.50 Buggy Work. Axle beds, each. \$1.25 Axle setting. 1.25 Body and up. 8.00 Body corners, tin, per set. 1.00 Body sides. 2.00 Body ends. 1.50 Bow socket, each. 75	Lays, sharpened, 14 inch
Trimming feet. 25 Fitting up four new shoes. 1.00 Fitting up four old shoes. 75 Wagon Work. Axles, 3½ x 4½, hickory. \$3.50 Axles, 4 x 5, hickory. 4.00 Axles, skeins, cast. \$8.00 and up Box, wagon box, complete. 18.00 Box, wagon box, extra top 5.00 Box, bottom 4.00 and up Box, cleats. 25 Box, sides 3.50 Box, seat 3.50	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat. 2.50 Buggy Work. Axle beds, each. \$1.25 Axle setting. 1.25 Body and up. 8.00 Body corners, tin, per set. 1.00 Body sides. 2.00 Body ends. 1.50 Bow socket. each. .75 Bow socket rivets, each. 10	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00 Body corners, tin, per set 1.00 Body sides 2.00 Body ends 1.50 Bow socket, each 75 Bow socket rivets, each 10 Buggy seat 2.50	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00 Body corners, tin, per set 1.00 Body sides 2.00 Body ends 1.50 Bow socket, each 75 Bow socket rivets, each 10 Buggy seat 2.50 Body for spring wagon \$12.00 and up	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00 Body corners, tin, per set 1.00 Body sides 2.00 Body ends 1.50 Bow socket, each 75 Bow socket rivets, each 10 Buggy seat 2.50 Body for spring wagon \$12.00 and up Cutting down buggy 10.00	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat. 2.50 Buggy Work. Axle beds, each. \$1.25 Axle setting. 1.25 Body and up. 8.00 Body corners, tin, per set. 1.00 Body sides. 2.00 Body ends. 1.50 Bow socket, each. .75 Bow socket rivets, each. 10 Buggy seat. 2.50 Body for spring wagon. \$12.00 and up Cutting down buggy. 10.00 Cockeve hooks, each. 15	Lays, sharpened, 14 inch
Trimming feet. 25 Fitting up four new shoes. 1.00 Fitting up four old shoes. 75 Wagon Work. Axles, 3½ x 4½, hickory. \$3.50 Axles, 4 x 5, hickory. 4.00 Axles, skeins, cast. \$8.00 and up Box, wagon box, complete. 18.00 Box, wagon box, extra top. 5.00 Box, bottom. 4.00 and up Box, cleats. 25 Box, sides. 3.50 Box, sides. 3.50 Box, sill. .75 Bolster, front. 1.75 Bolster, plate, upper. .75 Bolster, plate, lower 1.00	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00 Body corners, tin, per set 1.00 Body sides 2.00 Body ends 1.50 Bow socket, each .75 Bow socket rivets, each 10 Buggy seat 2.50 Body for spring wagon \$12.00 and up Cutting down buggy 10.00 Cockeye hooks, each 15 Clips for axles, each 25	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00 Body corners, tin, per set 1.00 Body sides 2.00 Body ends 1.50 Bow socket, each 75 Bow socket rivets, each 10 Buggy seat 2.50 Body for spring wagon \$12.00 and up Cutting down buggy 10.00 Cockeye hooks, each 15 Clips for axles, each 25 Clevises, each 25 Clevises, each 25	Lays, sharpened, 14 inch
Trimming feet. 25 Fitting up four new shoes. 1.00 Fitting up four old shoes. 75 Wagon Work. Axles, 3½ x ½, hickory. 4.00 Axles, skeins, cast. \$8.00 and up Box, wagon box, complete. 18.00 Box, wagon box, extra top 5.00 Box, bottom 4.00 and up Box, cleats. 25 Box, sides. 3.50 Box, side. 3.50 Box, sill. 75 Bolster, front. 1.75 Bolster, plate, upper. 75 Bolster, plate, lower 1.00 Bolster, standard, new irons, each 1.00 Bolster, standard, old irons, each 75	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00 Body corners, tin, per set 1.00 Body sides 2.00 Body ends 1.50 Bow socket, each 75 Bow socket rivets, each 10 Buggy seat 2.50 Body for spring wagon \$12.00 and up Cutting down buggy 10.00 Cockeye hooks, each 15 Clips for axles, each 25 Clevises, each 25 Double and single trees 75 and up	Lays, sharpened, 14 inch
Trimming feet. 25 Fitting up four new shoes. 1.00 Fitting up four old shoes. 75 Wagon Work. Axles, 3½ x ½, hickory. \$3.50 Axles, skeins, cast. \$8.00 and up Box, wagon box, complete. 18.00 Box, wagon box, extra top 5.00 Box, bottom 4.00 and up Box, cleats. 25 Box, sides. 3.50 Box, seat. 3.50 Box, sill. 75 Bolster, front. 1.75 Bolster, plate, upper. 75 Bolster, plate, lower 1.00 Bolster, standard, new irons, each 1.00 Bolster, standard, old irons, each 75 Brake, complete. 7.00	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat. 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00 Body corners, tin, per set 1.00 Body sides 2.00 Body ends 1.50 Bow socket. each 75 Bow socket rivets, each 10 Buggy seat 2.50 Body for spring wagon \$12.00 and up Cutting down buggy 10.00 Cockeye hooks, each 25 Clevises, each 25 Double and single trees 75 and up Fifth wheels, each 2.50 and up	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00 Body corners, tin, per set 1.00 Body sides 2.00 Bow socket, each 75 Bow socket, each 10 Buggy seat 2.50 Body for spring wagon \$12.00 and up Cutting down buggy 10.00 Cockeye hooks, each 15 Clips for axles, each 25 Clevises, each 25 Double and single trees 75 and up Fifth wheels, each 2.50 and up Hammar, T strap, new 75	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00 Body corners, tin, per set 1.00 Body sides 2.00 Body ends 1.50 Bow socket, each 75 Bow socket rivets, each 10 Buggy seat 2.50 Body for spring wagon \$12.00 and up Cutting down buggy 10.00 Cockeye hooks, each 15 Clips for axles, each 25 Clevises, each 25 Double and single trees 75 and up Hammar, T strap, new 75 Hammar strap, plain 25	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00 Body corners, tin, per set 1.00 Body sides 2.00 Body ends 1.50 Bow socket, each 75 Bow socket, each 10 Buggy seat 2.50 Body for spring wagon \$12.00 and up Cutting down buggy 10.00 Cockeye hooks, each 15 Clips for axles, each 25 Clevises, each 25 Double and single trees 75 and up Fifth wheels, each 2.50 and up Hammar, T strap, new 75 Hammar, T strap, plain 25 Hammar, T strap, welded, each, 50,	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps. 50 Tongues, cross piece 25 Wagon box seat 2.50 Buggy Work. Axle beds, each \$1.25 Axle setting 1.25 Body and up 8.00 Body corners, tin, per set 1.00 Body sides 2.00 Body ends 1.50 Bow socket, each 75 Bow socket rivets, each 10 Buggy seat 2.50 Body for spring wagon \$12.00 and up Cutting down buggy 10.00 Cockeye hooks, each 15 Clips for axles, each 25 Clevises, each 25 Double and single trees 75 and up Fifth wheels, each 2.50 and up Hammar, T strap, new 75 Hammar, T strap, new 25 Hammar, T strap, welded, each, .50 50 two for 75	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps	Lays, sharpened, 14 inch
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Trimming feet	Tongues, caps	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps	Lays, sharpened, 14 inch
Trimming feet	Tongues, caps	Lays, sharpened, 14 inch

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Quick-Wear-Out Tires Do Not Pay

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are made of the highest grade gum, fresh from the rubber trees—lively and durable. It is quoted on the market at \$1.30 per pound today. We could buy "Laport" or "Guayule" rubber at 35 cents a pound, or even old reclaimed rubber at 10 cents per pound, but it won't do for a Goodyear. Notice the Goodyear Wings. They keep out all dust, grit, mud and water, which gets in under the ordinary solid tire and wears it away. Write today for booklet showing how Goodyear's are built. Ask for sample section.

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are known for their uniform accuracy and strength. The careful mechanic relies on them for perfect work. If you're not using Derby tools ask your dealer for them the next time you buy. They will satisfy. Write for COMPLETE CATALOG of up-to-date screw-cutting tools. Sent Free.

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THE BEST YET

Best High-grade Steel, Hard, Thorough Temper. Sharp Cutting Edge. Sharp, Strong Teeth, Well Backed.

EVERY RASP PERFECT AND WARRANTED

Made in all regular sizes, and in the new 18-inch Slim, which gives the user the advantage of a long stroke, and at the same time a rasp of medium weight.

ASK YOUR DEALER FOR THEM



Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, July 21, 1909, and are subject to fluctuations. Corrected for The American Blacksmith by The National Heary Hardware Reporter, Chicago.

Correspondents report changes in quotations on patent wheels which have been noted in proper column. Excessive competition is reported in poles and shafts with a resulting reduction in these quotations at some jobbing centers. A slight reduction is also reported in toe calks.

Correspondents report trade conditions up to normal and in some localities better than last month. Shoeing generally is reported light, while dealers carrying automobile supplies are very busy. Colections generally show no great improvement.

lections generally show no great improvement.

lections generally show no great improvement	nt.
Horse Shoes— All Iron Shoes Steel Shoes No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg Mule Shoes.	\$4.40 4.25
additional charged for packing more than one size in a keg Mule Shoes. X. L. Steel Shoes. Countersunk Steel Shoes Goodenough, heavy Goodenough, sharp. Toe Weight Side Weight E. E. Light Steel Steel Driving O. O. Mule Shoes, extra	4.90 5.50 6.00 5.75 6.00 6.50 7.00 9.25 5.50 1.50
Merchant Bar Iron— \$1.70 rates full extras, and 20 cention 100 pounds extra for broken bundles.	
Steel Bars— \$1.70 rates, full extras.	
Blunt Sharp	er box. \$1.25 1.50
Carriage Bolts— 6 x i and smaller	0-10%
Machine Bolts— 4 x ² and smaller	
Nuts— Less than 10 lbs, of a size \$2	.50 off
Washers— Skeins— Cast	65%
Malicables— Haif Patent Axles Common \$.09	
Springs— Single Spring, each	\$1.25 .06
Hickory Lumber—Per Foot— 1 to 2½	\$.09 1
Ash and Oak Lumber—Per Foot— 1-1\frac{1}{4}	\$.08 1 .09 1
Yellow Poplar Lumber—Per M. Feet— 6 to 12 13 to 17 1	8 to 24
## \$65.00 \$65.00	\$75.00 80.00
68.00 75.00	85.00 104.00
2 _n } 72.00 80.00	104.00
Rough Hickory Axles—	Each.
Rough Hickory Axles— 3 x 4 6 ft 3 x 4 2 6 ft 4 x 5 6 ft 5 x 6 6 ft 4 x 5 6 ft 5 x 6 6 ft 5 x 6 6 ft 5 x 6 6 and 7 ft 5 x 6 7 ft	Each. \$.60 1.00 1.20 2.20 1.30 2.00 3.00 3.50
3 x 4 6 ft 3 x 4 4 6 ft 4 x 5 6 ft 4 x 5 6 ft 4 x 5 6 ft 4 x 5 6 ft 5 x 6 6 and 7 ft	\$.60 1.00 1.20 2.20 1.30 2.00 3.00

Rough Oak Bolsters-

Finished Oak Bolsters— 27 x 37 and under... 3 x 4 31 x 41

Rough Oak Wagon Tongues— 4 x 4 x 2 x 4 x 12 and smaller

nished tak wagon tongues—
3½ and smaller......
4

Finished Oak Wagon Tongues—

Two Inch S	awed Hour	nder	Per	Pair \$.40
Front Hind Patent Who				.5 5
A. B. No D. No. 13	3 and und	nder	35	45 % -5 %
All Grade C. No. 13	es, No. 39 a s and under	and Larger		-5 % -21 %
Cupped Oak	Hubs— S	et. Plain E 40 10 x 1	4	\$3.45
8 x 9 x 8 x 10 x	10 1.	65 11 x 1	5 6 6	4.50 4.75 5.35
9 x 10 x 9 x 11 x 10 x 12 x	12 2. 12 2. 13 3.	10 12 x 1 20 13 x 1	8	6.00 6.55 7.50
11 x 13 x 12 x 14 x	9 \$1. 10 1. 11 1. 12 2. 12 2. 13 3. 14 4.	45 35		
Rough Saw 11 x 2 " 11 x 21"	3 x 3	5 2 5 23	x 2½" x 2 " x 3 "	2.00 4.75 5.75
12 x 22"	3 x 3 1.8	5 3 6.0	0	5.75
1 x 2 1" 2 x 2 1"	No. 2 No. 3	XXX—		\$4.00 4.00
		XXX er		\$2.15 2.35
i x 21" Farm Wage	on Bows—			2.90
Round T Flat Top Round T	op, x 2 op, x 2 op, x 21			\$.65 .80 1.40
Standard si Each	ze Piano B	odies with S	eats—	\$4.25
Plow Beam 1 Horse. 2 Horse.	ıs—			\$.70 .85
All Hickor	v and Oak	Spokes and	Patent Sp	1.00 okes-
Discount Wagon Nec		s & Lesh Li Mixed	st No. 5 Whi	
21 x 38"	Forest Se . \$2.15	scond Growt	h Second G \$4.25 5.50	rowth
	. 2.90 . 4.40 . 4.70	4.05	0.00	,
J 3 X 44	. 4.70	6.95	8.90)
	. 5.50	7 .85	10.50	
3 x 48° Single Tree	. 5.50 s—Oval—	7.85 Mixed scond Growt \$2.90	10.50 Wh h Second G \$3.50	ite rowth
3 x 48" Single Tree 21" 21" 21" 3 x 36"	. 5.50 s-Oval- Forest Se . \$1.60 . 1.70 . 1.80 . 2.45	7.85 Mixed econd Growt	10.50 Wh h Second G	ite rowth
3 x 48" Single Tree 21" 21" 3 x 36" 3 x 38" 3 x 40"	Forest Se. \$1.60 1.70 1.80 2.45 2.65	7.85 Mixed econd Growt \$2.90 2.95 3.05 3.55 4.00	10.50 Wh h Second G \$3.50 3.60 3.80 4.20	ite rowth
3 x 48" Single Tree 21"	5.50 s—Oval— Forest Se . \$1.60 . 1.70 . 1.80 . 2.45 . 2.50 . 2.65 s—Round—	7.85 Mixed econd Growt \$2.90 2.95 3.05 3.55 4.00 Forec \$2.1	10.50 Wh Second G \$3.50 3.60 4.20 4.85 Second G 4.30 4.30 4.30 3.60 4.30 4.30	ite rowth
3 x 48" Single Tree 21"	5.50	7.85 Mixed seond Growt \$2.90 2.95 3.05 3.55 4.00 Forec \$2.1	10.50 Wh h Second G 3.60 3.80 4.20 4.85 \$\text{st Second G} 3.63 0.365 5.3.75 5.4.25	ite rowth rowth
3 x 48" Single Tree 21" 3 x 36" 3 x 36" 3 x 40" Single Tree	5.50 s—Oval— Forest Se . \$1.60 . 1.70 . 1.80 . 2.45 . 2.50 . 2.65 s—Round—	7.85 Mixed econd Growt \$2.90 2.95 3.05 3.55 4.00 Forec \$2.1 2.1 2.8 3.4	10.50 Wh h Second G 3.50 3.80 4.20 4.85 st Second G 0 \$3.60 5.3.75 5.4.25 5.4.20 ow Doublet	ite rowth rowth
3 x 48" Single Tree 21"	5.50	7.85 Mixed econd Growt \$2.90 2.95 3.05 3.55 4.00 Force \$2.1 2.1 2.1 2.8 3.4 s= Flat Pl 1.75 1.1 x	10.50 Wh h Second G 3.60 3.80 4.20 4.85 st Second G 0 3.65 5 3.75 5 4.80 ow Doublet 3½ x 42"	ite rowth rowth
3 x 48" Single Tree 21"	5.50	7.85 Mixed econd Growt \$2.90 2.95 3.05 3.55 4.00 Force \$2.1 2.1 2.1 2.8 3.4 s= Flat Pl 1.75 1.1 x	10.50 Wh h Second G 3.60 3.80 4.20 4.85 st Second G 0 3.65 5 3.75 5 4.80 ow Doublet 3½ x 42"	rowth side rowth rowth 4.80
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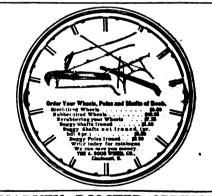
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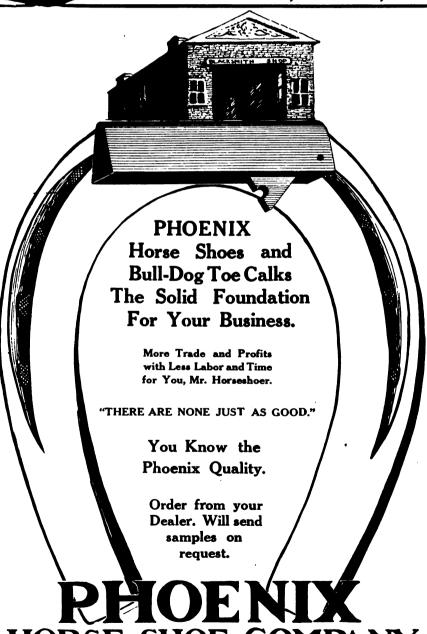




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Trade Literature and Notes.

PERHAPS IT HAS NEVER OCCURED to our readers that horse training and colt breaking might be considered a profession. However, Professor Jesse Beery, of Pleasant Hill, Ohio, claims an excellent livelihood can be made by following this business. He has a system for teaching his method of horse training by mail and further details will be found in his advertisement or from him THE PIONEER POLE & SHAFT CO., who suffered such a severe loss some time ago through the cyclone which passed through Anderson and Sydney, are able to make prompt shipments of all orders. They have completed the rebuilding of the factories, which were damaged and will be very glad to give their very best attention to the orders of our readers. PERHAPS IT HAS NEVER OCCURED to our

THE PARRY MANUFACTURING CO., of Indianapolis, have just issued a new accessory catalogue. The Accessory Department of the Parry plant has sprung into rapid prominence and the new book has been issued with a view to show the trade what an extensive line they are able to furnish. The catalogue is handsomely gotten up, prices are printed in plain figures and what we consider a good idea is the printing of freight rates to various points, which are given for the convenience of those referring to this very complete publication.

THE GOVERNMENT has recently placed an order with The Foos Gas Engine Company, of Springfield, Ohio, for six of their Vertical Engines, to be used in the operation of locks on the Ohio

to be used in the operation of locks on the Onio River.

The locks are operated by air, the four engines for driving the compressors being of 100 H. P. each, and the smaller ones used for auxiliary apparatus. The engines specified are the regular Foos Vertical, three-cylinder, single acting engines, using natural gas for fuel. According to the Foos people the power requirements will be very exacting, and the reliability of the engines installed must be beyond question.

THE HASTINGS MOTOR BUGGY CO., of Chicago, whose advertisement you will find on another page, has a solendid proposition for anyone who desires to build his own automobile. The Hastings people claim that any blacksmith can build a complete motor buggy by using their chassis for approximately three hundred dollars.



It seems to us that this proposition should appeal to a large number of our readers who will possibly build a machine for their own use, or who might even go so far as to build them for pront. This firm is a very progressive one an I they are very anxious to give complete details of their splendid proposition to all who are interested.

MANY OF OUR READERS may be interested to know that Mr. D. M. Parry, who was formerly president of the Parry Buggy Co. and who has just severed his active connection with that concern, has organized a company with a capital of one million dollars to be known as The Parry Automobile Company, with headquarters in Indianapolis. It is said that the new plant will employ two thousand persons and that no fewer than five thousand cars will be built in 1909. The automobile to be manufactured will be called The Parry, and there will be two styles: one a runnbout that will sell for \$1,250, and another a four-cylinder, thirty-horsepower, five-passenger touring car that will sell for \$1,400. It will be the Parry policy to manufacture medium-priced cars, just what the people want. people want.

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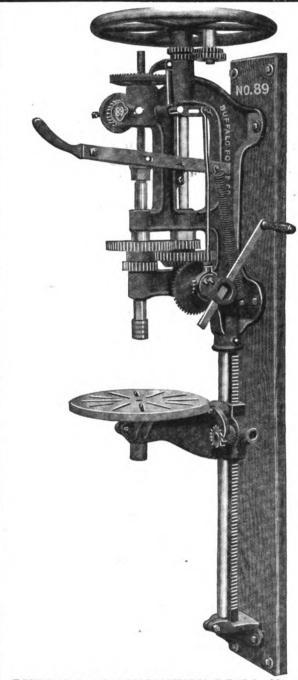
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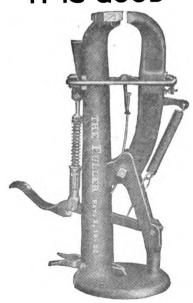


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WRITE FOR CATALOG AND PRICES



DETROIT TWIST DRILL CO. 228 21st Street. Detroit, Mich.

Great Power-Small Cost No Risk

Buy a powerful engine that is durable, economical and absolutely safe.

Waterloo Gas Engines

develop the full rated horse power and more. They are guaranteed for five years at any kind of work, never shut down for repairs, are absolutely simple in operation, and all sizes furnish the chaepest power for every purpose. Best for machinists, miners, millers, manufacturers, printers, farmers—for drilling, pumping, running air compressions, etc. Sold on credit if desired. Write today for free Encyclopedia of Engine Facts.

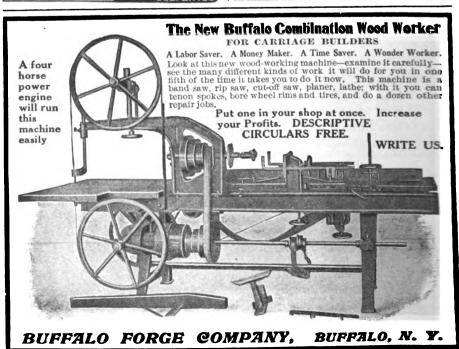
of Engine Facts.

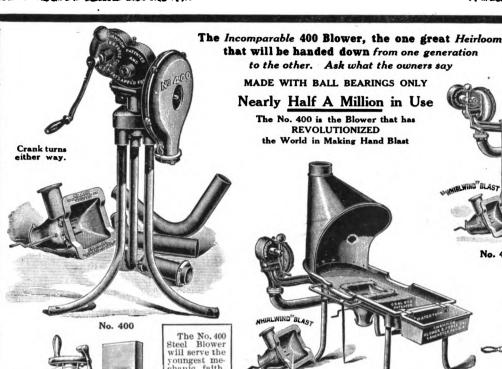
Waterloo Gasoline
Engine Company,
T-198 West Third Ave., 5
Waterloo, -- Iowa.

Year

THE MAN
who knows
uses
STERLING
WHEELS
They give
results
The Starling Emery Wheel Mfg. Co.

The Sterling Emery Wheel Mfg. Co. TIFFIN, OHIO, U. S. A.





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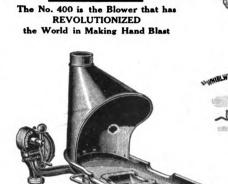
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110

The No. 400 Steel Blower will serve the youngest me-chanic faith fully without expense for a long lifetime.



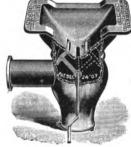
to the other. Ask what the owners say MADE WITH BALL BEARINGS ONLY

> No. 408. Steel Blacksmiths' Forge



A Tuyere Iron That Makes A Whirlwind Blast.

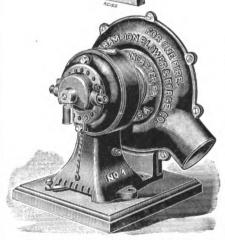
The No. 400 Champion "Whirlwind" Blast Anti-Clinker, Heavy Nest Tuyere Iron is furnished with all No. 400 Blowers WITH-OUT EXTRA COST.



The "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron produces a circular, rotary whirlwind blast and concentrates the heat in the tuyere nest, not permitting it to blow up and out of the chimney, therefore, makes a hotter fire and heats the iron one third quicker, saving much coal.



No. 203. Self-feed and Lever-feed Drill



DRILLS TO CENTRE OF 16 IPCH CIRCLE

BALL-BEARING

DRILL

No. 1—One-Fire Variable Speed Electric Blacksmiths' Blower, with five speeds for LIGHT, MEDIUM and HEAVY fires.



The Champion Patented Never-Slip Chuck is applied to all CHAMPION DRILL SPINDLES without extra charge



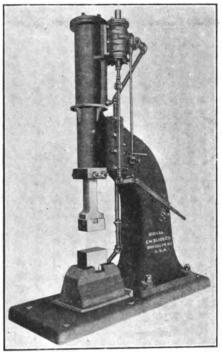
Screw Plates in four styles, cutting up to 11/2 in, Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power Blower, or Electric Blower, write for our free catalogue, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



American Tire and Axle Shrinker. Will shrink up to 4 x 1 inches round edge tire, and axles up to 11/4 inches.

THE CHAMPION BLOWER & FORGE CO., Lancaster, Pa., U. S. A.

MANY OF OUR READERS will undoubtedly be interested in learning about the Compound Pneumatic Forging Hammer just being introduced by the E. W. Bliss Co., of Brooklyn, N. Y. Many advantages are claimed over the steam hammer and its economy of operation is a particular point for consideration. Owing to the improvements nale in recent years along the line of gas producers and gas engines in many orging shops steam has been entirely climinated, except for running steam hammers. running steam hammers.



The hammer is simple in operation and very positive in its action, it is much easier to run than the ordinary steam hammer on account of its striking one blow and then returning to its upper

position. For this reason the operator does not have to be skilled, nor even quick motioned to get a sufficient blow. The hammer is always cold and there is no water dripping down on the dies nor steam leaks sputtering all over the men, for which reasons operators prefer this type of hammer to the steam hammer.

The hammers which the Bliss Co. build in sizes to cover all requirements are substantially constructed, having few wearing surfaces and are well lubricated, while their method of operation is simple. Any weight of blow, light, regular, extra heavy or holding down, can be given by the movement of the lever.

We suggest that interested parties get in touch with the manufacturers.

with the manufacturers

ment of the lever.

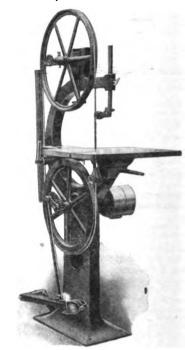
We suggest that interested parties get in touch with the manufacturers.

A VERY USEFUL TOOL which has just been put on the market is Fuller's Self-Locking Foot Vise. It is claimed this vise will hold a shoe for turning heels, pulling off old toes, steel plugging, filling, etc., and it is also adapted for job work when upsetting iron. turning angles, etc. The adjustment for holding stock of different thickness is automatic, and it will grip and hold the kor thin stock equally well. This excellent tool has many other advantages and further information may be had from the makers, Hamilton Mfg. Co., Des Moines, Ia., whose advertisement you will find on another page.

THERE HAS RECENTLY COME into our hands from Roth Bros. & Co. a circular descriptive of their electric motors used in connection with band saws for wood or metal. The Roth plan is to operate machinery by individual motors, thus doing away with a large amount of shafting and belting. Most wood working operating machinery operates at high speed, and this, of course, necessitates the shafting and belting also running at high speed. The losses in shafting and belt transmission have been very high, and aside from the objection of the danger due to these high-speed power transmitters and the dust, dirt and noise, the old system is not as satisfactory as it might be. The circular of Roth Bros. & Co. illustrates and describes the various ways of attaching the motor to the machinery and any who have electric power in their shops, or who contemplatusing it, would do well to send for the pamphlet.

WE HAVE JUST RECEIVED from The Silver Manufacturing Co. Calem, Ohio, a very attractive circular, showing their new improved twenty-inch band saws. They illustrate one for foot power only, another combined foot and belt power machine, and also one for belt power only. The Silver Manufacturing Co. claim several very novel features for these new products, notably the planetary or "sun and planet" arrangement. Practically every other foot power band saw

to either the lower band wheel, or to some other wheel of large diameter. There are several other time and labor saving attachments to these new muchines mentioned in their circular which lack of space does not permit us to enumerate. As the



cut indicates, the new machines are exceedingly simple in construction and we recommend to any of our readers who are interested that they write to the above-mentioned firm for further descrip-

TO ALL OF OUR READERS who are interested in cushion heel horseshoes we would suggest that they obtain from The Humane Horse Stoe Com-puny, of Lima, Ohio, the handsome little booklet which they issue, descriptive of their goods.



FOR YOUR LETTER-**HEADS**

A good letterhead is always better with the addition of a good illustration.

What better subject can you choose than the horse's head-what better head than the one shown here. We can supply cuts of this beautiful horse's head

at 80 cents each. Use it on your letter-heads, bill-heads, envelopes, circulars, and all of your printed matter. Neat printed matter means more business for you. Send for a cut of this beautiful head today, and use it on your next batch of printing. Check, money order, stamps or registered letter will do.

AMERICAN BLACKSMITH COMPANY

P. O. Box 974

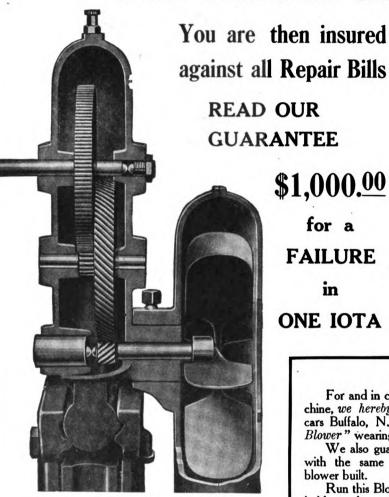
BUFFALO

N. Y., U. S. A.

Don't Worry and Struggle with the Antiquated Heirloom Get a "Buffalo 200 Silent Blower"

for a

in

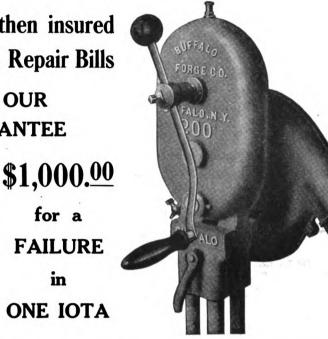


See simplicity of construction

Reasons This Strong Guarantee Is Possible

The fan case of the "Buffalo 200 Silent Blower" is so constructed that it

NEW YORK



Guarantee Certificate

For and in consideration of the purchase price of this machine, we hereby guarantee to replace, free of charge, f. o. b. cars Bulfalo, N. Y., any parts of the "Buffalo 200 Silent Blower" wearing out within ten (10) years.

We also guarantee this Blower to produce a stronger blast with the same number of turns of the crank than any other blower built.

Run this Blower 24 hours per day and the guarantee still holds good. BUFFALO FORGE COMPANY.

V.T. Mend

President.

Delivers More Air Per Turn of Crank

than any other blower. Nature's law is observed. The delivery is along the line of least resistance and without any loss.

The Greatest Blast With the Least Power

Machine cut gears, spur drive, helical speed, mesh perfectly, run in oil. Gears run in extra long journal bearings, bored and reamed in the solid metal of the case. Perfect alignment always retained. End thrust balanced on ball bearings. No appreciable friction. Improves with use. All enclosed in dust and oil-proof case.

Buffalo Forge Company Buffalo, N.Y.

CHICAGO

Ask your dealer for and insist upon "Buffalo" tools. If he does not supply them, write us and we will see you get the right goods at the right price. Remember, the name "Buffalo" is cast on every tool,

No matter how seldom you use tools, you need the best.

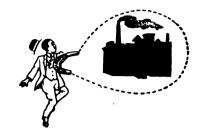
"MORSE"

Drills, Reamers, Cutters, Chucks, Taps, Dies, Arbors, Counterbores, Countersinks, Gauges, Mandrels, Mills, Screw Plates, Sleeves, Sockets, Taper Pins, etc., are without question as good as can be made. Large manufacturers who have had a chance to try out different kinds already know this, and others are going to know it if telling will avail.



A postal card request will bring you a "MORSE" catalog. Better have it if you are in doubt as to what kind of tools you want.

Morse Twist Drill & Machine Co. NEW BEDFORD, MASS., U. S. A.

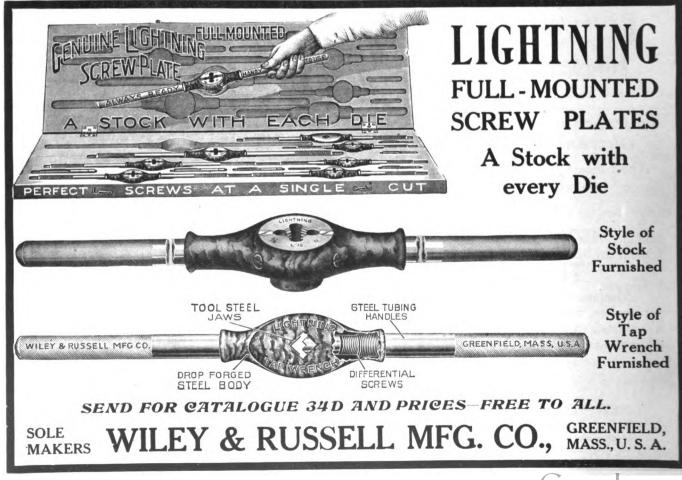


The only boomerang about "F-S" products is that Rush Orders are received by the sender sooner than expected.

You can surely find the color you want among "F-S" Superfine Coach Colors. The *quality* is guaranteed.

FELTON, SIBLEY & CO.

Manufacturers of Colors, Paints and Varnishes
136-140 N. 4th St., PHILADELPHIA





NATIONAL TIRE BENDING MACHINE

for rolling steel and iron tire for wheels to a circle of any desired diameter. It will bend tire from the lightest to 10° wide by 1° thick. Is heavy and well proportioned. Furnished with tight and loose pulleys, with friction clutch pulley, or direct connected motor, if desired at an additional charge. We also manufacture solid steel loose collar axles and the National self-oiling tubular axles and steel stock and hog troughs.

WRITE FOR CIRCULARS AND PRICES.

NATIONAL TUBULAR AXLE COMPANY,

EMIGSVILLE, PA.



BOLT CLIPPERS

CHAMBERS BROS. CO.

N. Fifty-Second St., PHILADELPHIA, PA.

The Ohio Nut & Bolt Co. BEREA. OHIO

Manufacture and Sell-





Blacksmiths' Drills

FROM THE 50,000-A-DAY PLANT

EVERY ONE A PERFECT TOOL

The CLEVELLY Twist Drill Co.

CLEVELAND, OHIO

CHICAGO



"MARVEL" **ELECTRIC BLOWERS**

"ONE FIRE" Marvel, \$28.00 For 4 Light Fires, 55.00 For 4 Medium Heavy Fires, 60.00 For 4 Heavy Fires, -80.00

For 8 Heavy Fires, -120.00 Ask your Dealer, the Electric Light Co., or write to

ELECTRIC BLOWER CO.,

352 Atlantic Avenue,

BOSTON, MASS.



SOUARE DEAL

OBTAINED IN BUYING

NUTS

Cold Punched or Hot Pressed, Square and Hexagon. Catalogue upon request. MILTON MANUFACTURING MILTON, PENNSYLVANIA.



RUBBER TIRED RUNABOUT, \$42.00 Top Buggy, \$35. Buggy Tops, \$4.60

ggy, \$35. Buggy 10ps, w...
Write for 100-page Catalog.
It's free. Compare our prices.
Established 1883.
BUOB & SCHEU,
100-500 Rast Court St. 0-520 East Court's

STEEL WHEELS



To Fit Any Wagon Plain or Grooved Tire

Farmer's Handy Wagons All Standard Types

Special Inducements

Write Today for Agency

EMPIRE MFG. CO., P. O. Box 300, Quincy, III.

THE DAYTON FTH WHEEL



(PATENTED.)

FOR ALL LIGHT VEHICLES. USED BY LEADING MANUFACTURERS.

Made in High-Grade Malleable Iron.

No. 440B. Buggy Size, 10 in., for 18 or 1 in. Straight Bed Axles.

No. 440C. Buggy Size, 10 in., for † or 1 in. Fantail Bed Axles.

No. 440E. Surrey Size, 12 in., for 1 in. Straight Bed Axles.

No. 440D. Surrey Size, 12 in., for 1_{15}^{1} or 1_{1}^{1} in. Fantail Bed Axles.

IMPORTANT

Axle Tie and Rear Perch Irons will be furnished for PLAIN AXLES unless SWAGED AXLES are specified when ordering.

SOLD BY THE FOLLOWING JOBBERS.

Baum iron Co., Omaha, Neb.
Beek & Corbett Iron Co., St. Louis, Mo.
Beek & Grege Hardware Co., Atlanta, Ga.
Bonniwell- Calvin Iron Co., Kansas City, Mo
Buford Bros., Nashville, Tenn.
Burgess- Frazier Iron & H'dwre Co., St. Joseph, Mo.
D. L. Carpenter & Co., Cincinnati, Ohio.
Campbell Iron Co., St. Louis, Mo.
Dayton Iron Store Co., Dayton, Ohio.
Des Moines Iron Co., Des Moines, Iowa.
Robert Donahue Iron & Hardware Co.

Robert Donahue Iron & Hardware Co., Burlington, Iowa. Faeth Iron Co. Kansas City, Mo.

Burlington, Iowa.

Paeth Iron Co. Kansas City, Mo.

C. D. Franke & Co., Charleston, S. C.
Fischer Iron & Steel Co., Quincy, Ill.
Fort Wayne Iron Store Co., Fort Wayne, Ind.
Fulton, Conway & Co., Louisville, Ky.
S. T. & G. A. Gebhart, Dayton, Ohio.
Grolock Vehicle Material Co., St. Louis, Mo.
Hamilton, Bacon & Hamilton Co., Bristol, Tenn.
Haysler Iron Co., Kansas City, Mo.
W. J. Holliday & Co., Indianapolis, Ind.
Huey & Philp Hardware Co., Dallas, Texas,
Jackson Hardware & Implement Co., Durango, Col.
Jones Hardware Co., Richmond, Ind.
Kelley, Maus & Co., Chicago, Ill,
G. A. Kempel & Co., Akron, Ohio,
Minneapolis Iron Store Co., Minneapolis, Minn.
Mossman, Yarnelle & Co., Fort Wayne, Ind.
National Hardware Co., Cincinnati, Ohio,
Nichols, Dean & Gregg. St. Paul Minn.
Oklahoma City H'dwre Co., Oklahoma City, Okla.
Orra Iron Co., Evansville, Ind.
Rubelmann-Lucas Hardware Co., St. Louis, Mo.
Sligo Iron Store Co., St. Louis Mo.



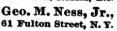
Clip Horses For Profit

This splendid machine only \$7.50. It is the Stewart No. 1. Send \$2 and we will ship it C.O.D. for the balance. If you are not pleased, return at our expense and get your money

CHICAGO FLEXIBLE SHAFT CO. 186 Ontario Street Chicago



STEEL STAMPS Steel Letters and Figures **BURNING BRANDS** Stencil Dies, Stencils, Etc.



Price List sent upon application.

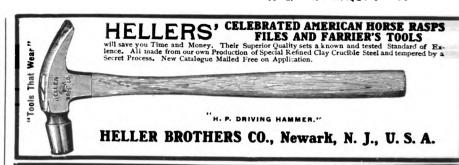




ABBOTT'S

BUGGY TOPS, \$4.60 TOP BUGGIES, \$35.00 RUNABOUTS, \$32.00 Cushion Backs, Storm Fronts, Poles & Shafts, Write for 100-page Catalog. **BUOB & SCHEU,**

500-520 Court Street. Cincinnati, Ohio





Try Borax-ette for Welding · Toe-Calks THEY WON'T KNOCK OFF

It makes steel weld like iron. It has no equal for welding tires, axles and springs

> FOR SALE BY ALL DEALERS SAMPLES FREE

CORTLAND WELDING COMPOUND CO., Cortland, N. Y.



The Bruce Malleable Wagon Standard

Tested thoroughly and guaranteed strictly as represented.
Note its great advantages over the old style.

1. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strength ening end of bolster, which in old style is weakened by mortise.

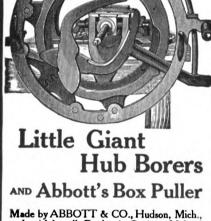
ened by mortise.

3. The Malleable Iron Standard has a 3½ in. face at base, which prevents wear on wagon box, while the old style has only

4. Great time saver. Can be attached to bolster in one fourth the time required to put on wood stake. Adapted to new and repair work.

If you have never tried the Bruce Standard, write today and ask for prices.

A. H. HARSHBARGER, Danville, Ill.



Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers' Machinery.

PHINEAS JONES & CO., Newark, N.J.

General Agents for the Eastern States



CRESCENT FORGE & SHOVEL CO., Havana, III., U. S. A.

- USE HORSE SENSE -

KEYSTONE DRAFT SPRING

Ask Your Jobber About It!

RAYMOND MANUFACTURING CO., Ltd. CORRY, PENNSYLVANIA

THE REYSTONE TRACE OR DRAFT SPRING RELIEVES THE HORSE OF ALL THOSE JARS CAUSED BY THE UNEVENNESS OF TO ITH TO ITH TAXED CLOSES, THE ROAD AND WHEN SMPLY SMPLY FULLEST CAPACITY STATES CONNECTION OF THE PRICE ASSETT CONNECTIO FULLEST CAPACITY SIMPLY ONNECTRIC THUS FURNISHING A ST. POSSTRIT IT OF STREET OF STREE THUS FURNISHING A ALL POSSIBILITY OF REFEAR AND AVOIDING REFACE LOOK INTO IT!

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Reece Combination Screw Plate No. 103

\$8.25 NET WILL BUY ONE



Get next to a good thing before too late. We build complete quip-vehicles. Our Chassis as well as engine and all other parts designed along most approved, latest and best lines in high wheel construction. We furnish the Chassis complete.

Build Your Own Motor Buggies

No Iron Working Machinery or Machinists Necessary.

A Buggy can be finished ready to run without any iron working machinery chinist whatever. Write for specifications and Catalog No. 151.

AUBURN MOTOR BUGGY CHASSIS CO.,

AUBURN IND.

The No. 103 Reece Combination Screw Plate

includes one Reece Adjustable Guide Stock, 24 inches long for 2 7-32 inch diameter DIES; Three individual Full Mounted Stocks; Seven Plate Taps and Seven Reece Adjustable Dies, cutting 1-4 — 20, 5-16—18, 3-8—16, 7-16—14, 1-2—12, 5-8—11, 3-4—10. REMEMBER that this is practically a FULL MOUNTED SET. REMEMBER that the Stocks have MOTTLED FINISH; that the DIES are adjustable, and make perfect threads at one cut; that four persons can use dies from this set at the same time because there are FOUR STOCKS. And LAST, but not LEAST, REMEMBER THE PRICE is only \$8.25 NET, and the Screw Plate guaranteed to give satisfaction or your money will be refunded. money will be refunded.

Can You Afford to Neglect This Great Opportunity?

We request you to place your order with your dealer. If for any reason he cannot fill the order (and he can if he wants to), THEN send to us. DO NOT ACCEPT SUBSTITUTES—INSIST on having the REECE COMBINATION SCREW PLATE No. 103.

THE E. F. REECE CO., Greenfield, Mass., U. S. A.

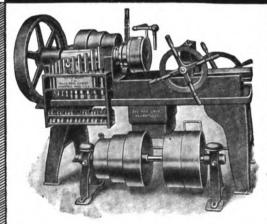
LICHTNING **GASOLINE ENGINES**



Steam Cooled Double Piston No Foundation

Send for Catalogue **Showing Superior** Points, and get

KANSAS CITY HAY PRESS CO. Kansas City, Me



Bolt Cutters

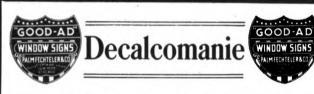
Hand or Power, with Little Giant Dies or with Die Heads Opening

All sizes to 2 in. Bolts or 2 1-2 in. Pipe Send for Catalog No. 20 B

WELLS BROS. COMPANY

GREENFIELD.

MASS.



TRANSFERS FOR ALL PURPOSES

Scrolls, Figures, Flowers, Letters, Animals, Stripings, Numerals, Corners, Etc., Etc.

Special Name Plates of all descriptions. Buggy Ornaments in sets. No Shop Complete without our Catalog.

New Catalog will be ready this spring, sent on receipt of \$1.00, which will be rebated on first order for more than this amount, or sent gratis with first order for \$1.00 or more. Plaid designs for automobile panels. Cane work effects. Basket work effects.

For the auto painter who has exhausted his ideas on distinctive color combinations.

> Stylish Inexpensive New WRITE FOR SAMPLES

Palm, Fechteler & Co.

67 Fifth Ave., NEW YORK

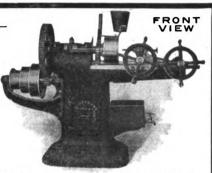
CHICAGO ST. LOUIS MONTREAL **TORONTO**



MERRIMAN

Bolt Threader

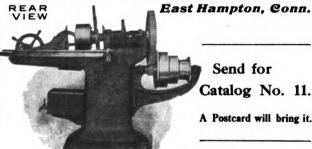
Best on Earth



A Bolt Cutter is Much Like a Man in This THE HEAD IS NEARLY EVERYTHING

The Merriman Bolt Cutter Head is noted for: Simplicity of the Head—only four parts. Great Durability—few repairs needed. Square Bearing of the Dies in the Ring. Solidity of the Dies like a Solid Die. Uniformity of the Product—Bolts all the same size. Effectiveness of Operation—Cheapest help can understand and run it. No machine turns out work more rapidly.

THE H. B. BROWN CO.,



Send for Catalog No. 11.

A Postcard will bring it.

NOTICE TO BLACKSMITHS The Way-Way Air Cooled

GASOLINE ENGINE

Built especially for Blacksmiths' Use. 2½, 3½, and 6 H. P.



Look at the other engines first. Note the multitude of rods, springs and triggers described as simple. Remember that the water tank (always left out of the cut) has to be filled and emptied every winter day. To forget it once may mean a ruined engine. Remember that water-cooled engines all have packed cylinder heads. Packing leaks and blows out. Inevitable trouble and loss of power blows out. Inevitable trouble and loss of power

ometime.

Then look at an engine that IS simple One-piece cylinder—no chance to leak—grows stronger with use. Everything enclosed—no frail parts—no water—not a piece of packing or a gasket in it—no gasoline pump troubles. It absolutely cannot be overheated under full load—any temperature—any length of time. Your judgment tells you to

WRITE FOR CATALOG "K." DO IT NOW.

The <u>New-Way</u> Motor Coleans Lansing Michigan U.S.A. 60 SHERIDAN ST.

AID FOR THE BLACKSMITH

Kerrihard Power Hammer

In the 1999 Model—Kerrihard Power Hammer—is offered by far the best, the most complete power hammer ever offered to the blacksmith trade. This is the concrete result of years of experience in manufacturing power hammers that have met the unanimous endorsement of blacksmiths everywhere. Here is a power hammer correct in every part, right in its proportions—taking up the minimum floor space consistent with efficiency—right in the metal from which it is east. No scrap—no junk heaps are drawn upon—when the Kerrihard is in the building—not a needless—burdensome fixture attachment. Each part working with every other—removing much of the heavy hand labor of the smithy, and transferring it to the hammer. That shop dependent upon hand-labor at the present day—when the Blacksmith's Best Friend—the Kerrihard Power Hammer is offered—is doomed to trail behind—instead of forging ahead. For—this hammer—is not only the best on the market—but 'tis also sold at a price which removes all objections from the standpoint of expense. And—the terms—are a sure evidence that the Kerrihard Hammer—must perform—according to promise—else your trial costs nothing.



Each Kerrihard Power Hammer—is soid under a Ten Days' Approval Test. No cost to you—if this hammer islis to do as we claim—or is in any manner unsatisfactory. We leave it to you—to determine its utility—its money-saving value,

Price \$60 — you save \$25 to \$50. This close price is the result of modern system in factory production. Not to be matched in quality—nor to be approached in Price, is the moto that's responsible for the enormous sale of Kerrihard Hammers. You save \$25 to \$50—under our plan-and secure the greatest value for your money.

Consider—all these—the Matchless Utility Value, the Embodiment of the Latest Improvements,—the Approval Test—the Low Price—then write Kerrihard for Specific Information and Descriptive Literature.

Literature.

A single day's delay means a loss to you—Today's action means—a step forward toward easing your physical labors and increasing your Bank account.

Will You-Do This-Just Now-Do Write



COMBINATION SAW and GRINDER

POWER HAMMER Hammer and Grinder Dept.

THE KERRIHARD COMPANY, Red Oak, Iowa, U. S. A.

I. H. C. ENGINES AS Blacksmith's Powers

You are working at a disadvantage if your shop is not equipped with a good reliable power.

You have all kinds of work to do. Power on a good many of the jobs is an absolute necessity.

Consider the matter carefully and you will discover the best of reasons why you should have an I. H. C. gasoline engine in your shop.

With one of these engines installed you will have the satisfaction of knowing you will have power whenever you need it. You will find it better than a line shaft because you do not have to pay for power you do not use. You start your I. H. C. engine going whenever you need power, There is no waiting. Power is delivered instantly. All the power you need will be generated and delivered at the lowest possible cost. And when your work is done you shut off the engine and stop all expense instantly.

An I. H. C. engine will not fail you. They are simple and easy to understand and they are built on right mechanical lines. You have your choice of many sizes and styles of I. H. C. Gasoline Engines:

Verticals—2, 3 and 25-horse power Horizontals (portable and stationary)—in 4, 6, 8, 10, 12, 15 and 20-horse power Air Cooled Engines—in 1 and 2-horse power

It will pay you to investigate these engines. It will interest you to look into their superior materials and the superior way in which they are constructed. International local agents have these engines on sale. Ask them for catalogs of the style you are interested in, or write direct to us.

INTERNATIONAL HARVESTER COMPANY OF AMERICA (INCORPORATED)

13 Harvester Building

CHICAGO, ILL., U. S. A.



IF you are an exponent of high-grade work in your shop, insist on your local coal dealer furnishing you with PANDO SMITHING COAL—highest carbon—no sulphur—every ton guaranteed. Write us if your dealer cannot furnish.

The Pittsburgh & Ohio Mining Co., Exclusive Producers, Rockefeller Bldg., Cleveland, O.



Licensed by Grinnell Mfg. Co.

GRINNELL,

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SHARP DIES

are what are needed in order to cut good threads, and have them if you



"DUPLEX" DIE STOCK SET

The dies in these sets are easier to sharpen than a knife; this fact enables you to get the full wear out of them. Write us.

THE HART MANUFACTURING CO.,

50 Wood Street.

Cleveland, O., U. S. A.

Brother Stimson says: "Stronger blast than any other blower."

Belmont, N. C., June 16, 1909.

BUFFALO FORGE CO, Buffalo, N. Y.

Dear Sirs: I bought one of your No. "200" Blowers some-ago. It is giving good satisfaction. * * * * time ago. It is giving good satisfaction. * * * *
I am impressed that your No. "200" will make a stronger

blast than any other blower
I like your No. "200" fan case as you can turn it and by us-

ing a long piece of pipe you can do away with one elbow.

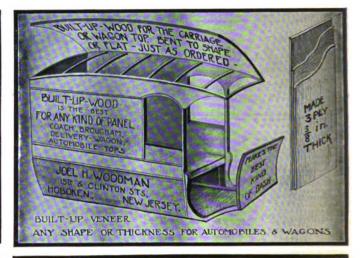
Your firm is the only one I know that guarantees their

blower ten years.

Yours respectfully,

(Signed) R. L. STIMSON.

See pages 33, 34 and 39.



Say! Mr. Blacksmith,

THE SCIENTIFIC

Blacksmiths are just wild about it where it is used, and the manufacturers are either crazy or dead sure they have a "cineh" on the other fellows for they actually warrant it to be better than any other and will let you be the judge.

GET ONE QUICK IF YOU WANT TO KNOCK OUT YOUR COMPETITORS.

Write for information at once to

National Hydraulic Tire Setter Co.

KEOKUK, IOWA.





wheel. It saves cut-ting and re-welding tire. This heater is perfectly constructed and is prac-tically inde-structible.

Write at once for description and our easy terms.

ROCHESTER TIRE HEATER CO., Rochester, N. Y.



Our Taps and Dies are the best that 34 years' experience and up-to-date methods can make them. The easiest cutting and longest wearing screw cutting tools made. Send for free catalog.

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The Gold Medal Anvil HIGHEST AWARD

OMAHA, 1898 PAN-AMERICAN, 1901

Every genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with the best Crucible Cast Steel. Every genuine "Hay Budden" Anvil is made by the latest improved methods.



ANVILS

Over 150,000 in Use WARRANTED

WEIGHTS FROM 10 to 800 LBS.

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO.,

BROOKLYN, N. Y.

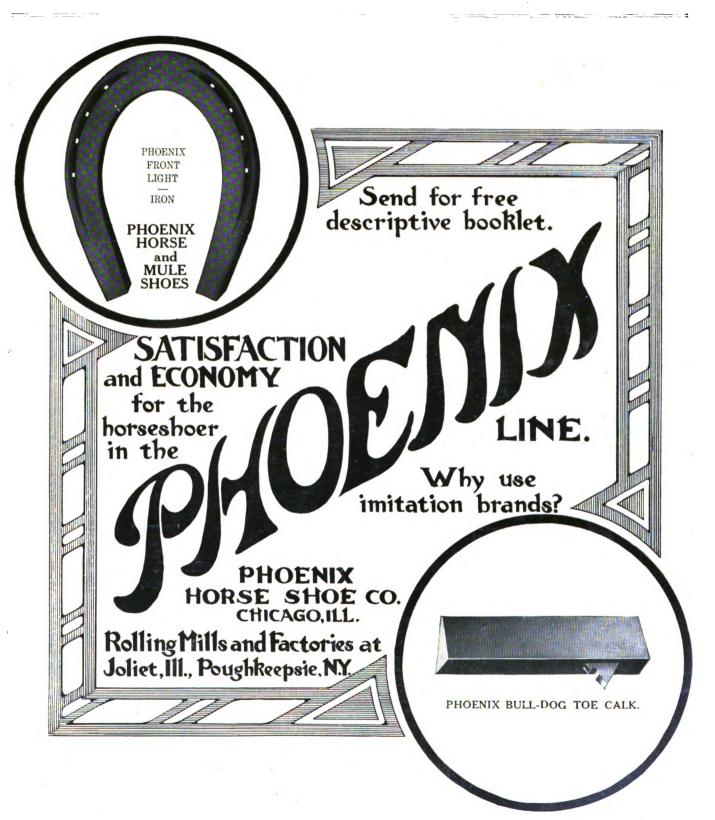
THE SEP 11 1909

AMERICAN BLACKSMIT

BUFFALO N.Y. U.S.A. A Practical Journal of Blacksmithing and Wagonmaking

SEPTEMBER, 1909

\$1.00 A YEAR 10c A COPY



Don't Buy "Banana" Sort of Machines---Buy SILVER'S.

Don't buy banana sort of machines. They may appear firm, but they wont stand pressure.

Silver's tools stand the pressure, turn out the work, save money and labor, suit you in size and price, because—The real Silver quality is in every one of them. Downright, honest construction and materials, backed by fifty five years of experience and knowing how.

Honest, durable, perfect working tools are the kind we make—the only kind we know how to make.

Our Time Against Yours to Talk It Over.

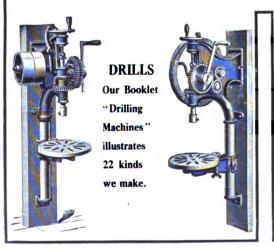
You don't obligate yourself in any way by talking this matter over with us, or by sending for our printed matter. We have booklets on our Drills, Forges, Band Saws and Jointers, and Hub Boring and Spoke Tenon Machines. We have a loose leaf 1909 catalog "for the asking." Which will it be for You?

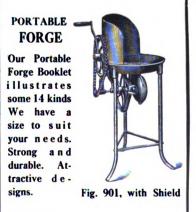
Write at once while the matter is fresh in your mind.

The SILVER MFG. co.

365 Broadway

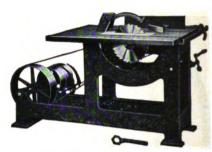
SALEM, OHIO



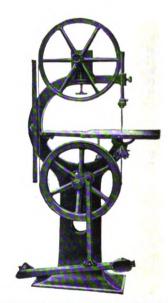




SILVER'S NEW JOINTERS
Five Sizes—8, 12, 16, 20 and 24 inch.
New "patent applied for" features.



SILVER'S SAW TABLES
Send for circular of Saw Tables and
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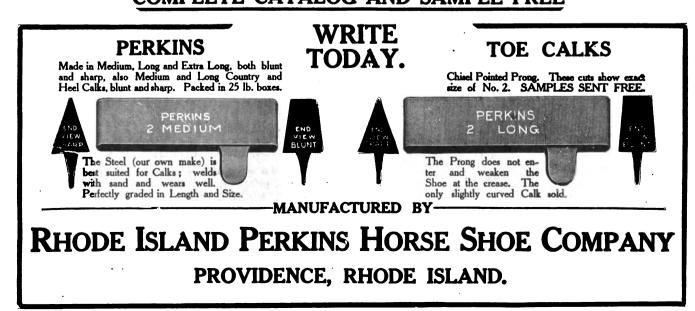
NEW PLANETARY BAND SAW 20-inch Foot or Combination.

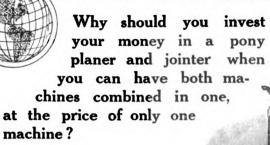


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Seven Sizes, Fitted with Star Hollow
Auger. Rigidly constructed.



Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send COMPLETE CATALOG AND SAMPLE FREE

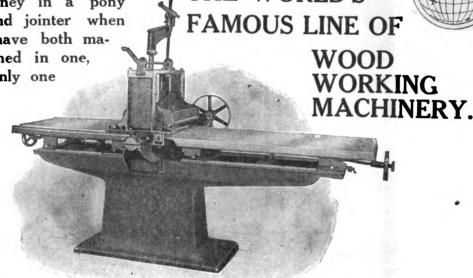




The accompanying cut shows the 20-in. Jointer fitted with our

New Patent
Applied for Power
Feed Planing
Attachment,

which will plane from 1-16 in. to 6 in. thick, and 20 in. wide, equipped with our HOISTER to swing the attachment around behind the machine entirely out of the way when you wish to use it for a standard jointer. We make this in 12 in., 16 in. and 20 in. sizes. Our prices are low.



THE WORLD'S

Write us at once for particulars.

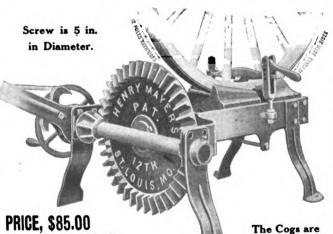
Sidney Tool Co., Sidney, Ohio, U. S. A.

You are a Mechanic. WILL YOU DO THIS? Please compare the cut of

MAYERS COLD TIRE SETTER

with all others. You can see at a glance how it works and understand it. No fixings, ginger bread or banjo work to adjust—or break. The MAYERS is as simple, as good, as solid, as powerful and as durable as it looks. About twice as heavy as other machines and every piece and part warranted steel. Both heads (right and left) are on a 5" screw and REALLY do what others FALSELY claim: PULLS BOTH SIDES. While others do set tires and satisfy some people, and they honestly indorse them, yet that does not disprove that the MAYERS is in a class all by itself for QUALITY of work. We will prove it. Are YOU afraid of your own JUDGMENT? We are not. Will YOU believe YOUR own eyes? No matter what your OPINION is NOW, a trial of this machine will convince you that it does set tires PERFECTLY, because it has the

RIGHT PRINCIPLE, drawing both sides at the same time. The trial will convince you. The price is about one half of the others. The terms are easy. The guarantee is ironclad. What more could a **PARTICULAR**, careful man want?



Weighs 800 lbs.

Every piece and part is Steel.

We have added a

JOBBING DEPARTMENT

to our business and are prepared to quote you prices on all kinds of TOOLS and MACHINERY. Our terms as to Payments will Interest you and it will pay you to write us and get our Plan.

MAYERS TIRE SETTER MFG. CO., 4028-4030 Forest Park Boulevard, St. Louis, Mo. P. S. WE MAKE A DISHER that YOU NEED. Write for cut of it.

extra quality Steel

NOT ONLY THE BEST

BUT ALSO THE CHEAPEST

EXTEND YOUR TRADE, INCREASE YOUR PROFITS, INSTALL A HOUSE COLD TIRE SETTER IN YOUR SHOP NOW.

The HOUSE is the one to buy, and don't be deceived by big sounding ads, for some men have no regard for truth, and besides, if required, you can try ours in your shop at our expense, though your neighbor likely has one, for there are about 3,000 in use. This is the real proof, also, that ours are the best, for if others are as good they would have as many in use. They certainly advertise the biggest.

The following evidence shows why men buy ours:

The House Cold Tire Setter is a Money Maker—Before I bought one seven years ago, I was poor and working in my shop alone, but now I work 18 men and have built a good two-story brick shop. The House Cold Tire Setter is responsible for it all. It his certainly kept the clear dollars dropping into my pocket.

A. B. GARBER.

They Never Wear Out—I have used my House Cold Tire Setter constantly for 7 years. It has never been out of fix, nor cost me one cent for repairs and I would not sell it for any price if I could not get another.

F. H. BRIGHTBILL.

Dallas, Tex., Dec. 1, 1907.

The House Cold Tire Setter is a Trade Getter—I bought one in 1904, prior to that time I had very little work, but after that I had worlds of it—for instance, I set 4,000 tires the second year and I got their other work, too, don't you forget it. I have set 117 tires in one day.

L. D. BUSBY.

Ft. Sam Houston, Tex.

See What Uncle Sam Says—The No. 3 House Cold Tire Setter which the Government bought in 1907 does all our work with ease. It is at once a great time and labor saver.

D. W. KILBURN, Captain and Q. M. 26th Infantry.

We have good evidence to show that the Government has not bought nor put in any cold tire setter but ours within the last three years, there, fore, any claim to the contrary is unfair and misleading. The real season is on now, the 7 wet years are past and the 7 tire setting years are here, so there is no time to lose. Write us at once.

HOUSE COLD TIRE SETTER CO., 216-218 S. Third Street, St. Louis, Mo. J. F. HOUSE, 201 Church St. Toronto, Ont., Canada.

HOT FORGED NIB **INSIST BUY** ON **FROM** "STANDARD" **YOUR CALKS DEALER** STANDARD NO.2 LONG Joliet, III. **FRANKLIN** WELDS EASILY Cambridge, **STEEL WORKS** Mass.

"CHICAGO" EMERY WHEELS CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in tha long run. A wheel that will save only one hour per day during yourbusy season would pay for itself in full.



"CHICAGO"
WHEELS SAVE TIME

They're made of stuff that cuts

Issery Whosts, Glob, Emery, Pet-Ishing Whosts, Grinding Machinery 136 Pass Catalogue for the Askins

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CHICAGO, U. S. A.

"QUICK ACTION" IGNITING DYNAMOS Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils, Send for Catalogue B.

The Knoblock-Heideman Mfg. Co., SOUTH BEND, IND.

The White Lily Gasoline Engine

is now made by

THE DAVENPORT ICE CLIPPING MACHINE CO.

1575 West Third St., Davenport, Ia.

Ask for Special Offer and Free Catalog

GOOD RULES TO GO BY

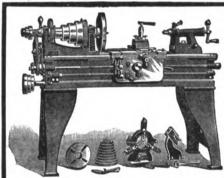
NC 465 THE LS. STARRETT CO. ATHOL MASS. U.S.A.

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BLACKSMITHS' HOOK AND HANDLE RULES

Made from hard rolled sheet brass, one-tenth inch thick, one and one-sixteenth inch wide, with heavy gradations and figures, graduated from the end in sixteenths of an inch on one side and from the inside of the hook in sixteenths of an inch on the other, adapting them for taking correct measurements from either the outside edge of a hot piece of iron, or from the inside when held against a corner. Graduated twelve inches, have fiat handles and measure over all sixteen and three-fourths inches.

Price, postpaid, \$1.15. Catalog No. 17 AH of fine Tools free. The L. S. STARRETT CO., ATHOL, MASS.



Built For Business

Our new 15-inch engine lathe, with all time and labor-saving improvements, heavy and substantial, a modern, practical, high-grade lathe, is the best for your shop.

It's a SEBASTIAN—a good lathe Investigate its merits—Write for Catalog.

Foot and Power Lathes, 9 to 15 in. Swing Tools and Supplies.

SEBASTIAN LATHE CO.

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Will turn off blue chips on any kind of work.

Firth-Sterling Steel Co.

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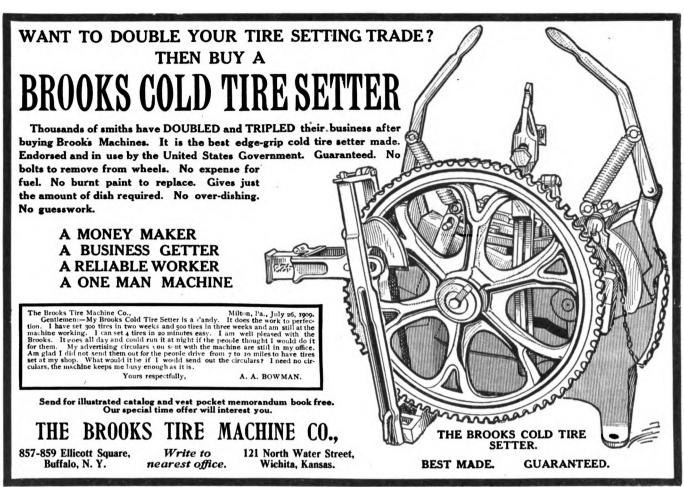
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SCOTT'S CRUCIBLE TOOL STEELS

Made in all grades Fully guaranteed All sizes in stock

THE
BOURNE-FULLER CO.
IRON STEEL
PIG IRON
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Cleveland, Ohio.



Buffalo Armor-Plate Multiple Punch, Shear and Bar Cutter.

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The frame is of armor plate, working parts of drop-forged steel, carefully machined and fitted. Knives and punches are of crucible steel, accurately fitted. The compound leverage gives ease of operation.

Four (4) Machines in One

Punches holes of five different sizes, cuts round or square rods, shears bars with absolutely no change of attachments.

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BUFFALO FORGE COMPANY
Buffalo, N. Y.





POLES AND SHAFTS

THE OUALITY MAKE

Recognized as best by experienced vehicle men everywhere.

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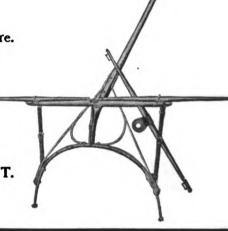
The Pioneer Pole & Shaft Co.

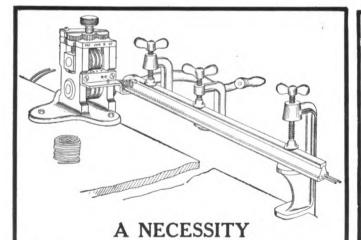
Headquarters and Sales Offices,

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Manufacturers of all styles and sizes of poles and shafts. A complete line that will SUPPLY EVERY REQUIREMENT. Have you our catalog and price list? If not, we want to send you both.





The Improved Climax Rubber Tire Wiring Machine

Used and endorsed by the Leading Carriage Manufacturers, Repair Men, Blacksmiths and Rubber Companies everywhere.

WE GUARANTEE IT

No more stretching, tugging, pulling of tires, losing time and dollars. The "Climax" pulls out old rusty wires and inserts new ones quickly, easily and successfully.

TIME-MAKES MONEY
EMPER-LESS WORRY
TROUBLE-KEEPS TRADE SAVES

MAKE MONEY

Guaranteed to be satisfactory or money refunded. A trial will convince YOU. Catalogue and prices on request. Made only by

THE SPENCER MFG. & MACHINE CO. SPENCER, W. VA.

NOTE—We manufacture the highest grade carriage, wagon, hardware and harness specialties. "Climax" Cable Traces, "Climax" Shaft Couplers, Boston Back Straps, Martingales and sundries. Send for catalogue A-1 for illustrations, endorsements, guarantees and prices. A postal will do.



Parker vises will to round in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings.

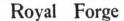
The steel faces on these vises are milled and fitted to the jaws and are removable. Have self-adjusting back jaws which automatically adapt themselves for holding wedge-shaped pieces.

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THE CHAS. PARKER CO., MERIDEN, CONN.



No. 100

SOME IMPROVEMENTS FURNISHED ON

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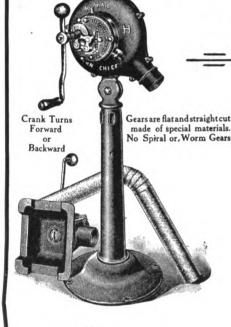
Chief

Nos. 1, 2, 3, 7, 12, 14, 15, 16, 17 and 18

THE BALL BEARING

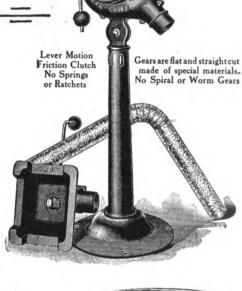
A Single Steel Ball resting on a hardened Steel Disc. This contact of Ball and Disc forms a bearing in which the friction is too little to estimate. : : :





Royal Blower









THE SAFETY CHUCK

It is opened and closed with the hand.

No more set screws to mar and bruise the shanks of bits. No more wrenches to tighten and loosen set screws.

No more twisting of bits in the chuck.

No more trouble in inserting and removing bits from chuck.

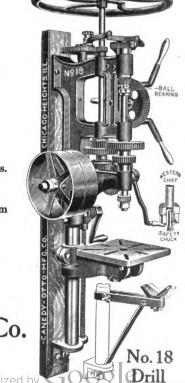


100 SIZES and STYLES to select from

Forges. Blowers Drills

Canedy-Otto Manufacturing Co.

Chicago Heights, Ill.



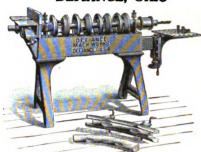


Invented and Built by THE DEFIANCE MACHINE WORKS



Wagons, Carriages, Automobiles, Hubs, Spokes, Wheels, Rims, Shafts, Poles, Neck-Yokes, Single Trees, Hoops, Handles of all kinds, Spools, Bobbins, Insulator Pins, Shoe Lasts. Table Legs. Balusters. Oval Wood Dishes & General Wood-Work.

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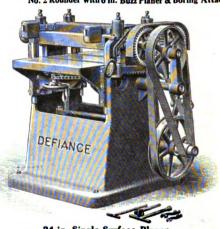


No. 2 Rounder with 6 in. Buzz Planer & Boring Attach-









No. 6 Vertical Borer.

No. 1 Post Borer.

28 in. Band Saw.

24 in. Single Surface Planer.

Eccles Ball Bearing Couplings

ALL OUR COUPLINGS ARE SHIPPED OUT WITH TWO-PIECE BUSHINGS FASTENED IN THE COUPLINGS

When Bushings are worn out by long use they can be instantly replaced and fastened into the socket by our special process.





Patented Nov. 25, 1902 Patented June 11, 1907

The spring is pivoted at the front so that it can be turned out of the way of the wrench while clipping Coupling to the axle.

NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS

Catalog No. 15 is our Latest

We make a full line of Carriage and Wagon Forgings

RICHARD ECCLES COMPANY, Auburn, N.Y.

MERIT THE BASIS OF "CAPEWELL" SUCCESS

Sentiment could never induce thousands upon thousands of Horse-shoers, in all parts of the world, to drive "Capewell" nails or lead many Horse Owners and Drivers to take the trouble and pains to see that no other brand of nail is used in shoeing their horses.

Merit is the basis of the wonderful success and reputation which the "Capewell" nail has won.

The superior quality of material used and the scientific processes employed by us have made it possible to develop a nail which will not split in driving or break at a critical moment and endanger the safety of horse and driver.

"Capewell" nails are half again as strong as any other nail manufactured, and there are more of these nails sold than of all other brands combined.

MADE BY

THE CAPEWELL HORSE NAIL CO. HARTFORD, CONN.

BRANCHES.

NEW YORK BUFFALO PORTLAND, ORE. BALTIMORE CHICAGO ST. LOUIS

DETROIT BOSTON PHILADELPHIA DENVER CINCINNATI

SAN FRANCISCO NEW ORLEANS TORONTO, Canada MEXICO CITY, Mexico YOKOHAMA, Japan

The Largest Manufacturers of Horseshoe Nails in the World.

No matter how seldom you use tools, you need the best.

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Drills, Reamers, Cutters, Chucks, Taps, Dies, Arbors, Counterbores, Countersinks, Gauges, Mandrels, Mills, Screw Plates, Sleeves, Sockets, Taper Pins, etc., are without question as good as can be made. Large manufacturers who have had a chance to try out different kinds already know this, and others are going to know it if telling will avail.



A postal card request will bring you a "MORSE" catalog. Better have it if you are in doubt as to what kind of tools you want.

Morse Twist Drill & Machine Co. NEW BEDFORD, MASS., U. S. A.



Good paint at a fair price—this, in 6 words, is the secret of "F-S" popularity.

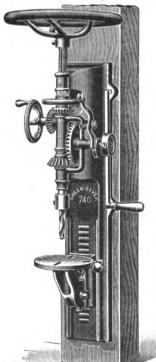
Raven Gloss Carriage Paints are unequalled for covering-properties and brilliance. They stand the test of time.

FELTON, SIBLEY & CO.

Manufacturers of Colors, Paints and Varnishes

136-140 N. 4th St., PHILADELPHIA

GREEN RIVER DRILLING MACHINES



Have "Ball Bearings"

The whole, including the bed-piece, is made of iron and steel so as to be uncommonly solid, stiff and durable. The shafts and gears are thoroughly keyed on and everything carefully made and fitted.

The automatic feed is capable of three changes, so easily made that the machines need not be stopped for the purpose.

The table, which is removable, is fitted to a forked arm suited to take wheels for drilling tires—the arm standing out from a carriage which slides in ways planed in the solid iron bed-piece.

The arm and table may be swung to any position sideways. The whole carriage is readily raised and lowered; a heavy latch managed with a handle supporting it at any point.

Drills as large as 1 in. in diameter, and to center of 15 in. circle. Hole in spindle, 1-2 in.; run of feed, 3 3-4 in. Table can be raised or lowered 14 in.

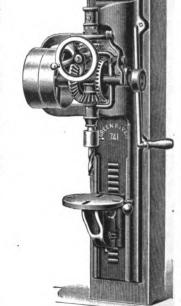
No. 740 for hand only.

No. 741 for hand and power.

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Greenfield, Mass., U. S. A.

Don't be bothered with a water tank and run the risk of aving a "freeze up" in cold weather. Order this engine n 30 days' free trial without signing your name to any apers or bin'ting yourself in any way whatever. We stand ack of it with a 5-year Guarantee. Ask us how we cool ithout a fan, and why we use one third less gasoline than the reader.

GADE BROS. MFG, CO., North High, Iowa Falls, Iowa.

THE PERFECT

The Only Hammer Made with extra long guides, insuring a direct vertical stroke of the ram.

POWER

HAMMER

((:

The Only Hammer Made with a disk attachment with a special anvil for sharpening plow and harrow disks.

Made in three sizes: 2½ in. Sq. Ram, Wt. 30 lbs. 80 ..

Prices are right. Write any jobber or

MACGOWAN & FINIGAN FOUNDRY AND MACHINE CO.

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Vulcan Iron Works

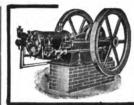
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Mason City, Iowa



Universal Tenon and Boring Machine

for wagon repair shops. Cuts tenons on set of wheels in twelve minutes.



THE AJAX GAS AND GASOLINE 5 to 10 H. P. ENGINES

For the small power user there are no better engines made. Their construction combines strength, simplicity and economy. Backed by the most accurate workmanship, made of the highest grade of material, every part interchangeable, our engines give years of satisfactory service. Learn more about them. Our big illustrated catalog mailed free on request,

AJAX WORKS, CORRY.



YOU'RE TIRED AND WORN OUT

From using that old-style Hand Blower. Get a Modern Electric

ROTH FORGE BLOWER AND ENJOY LIFE

Write for interesting prices and bulletin No. 1611

ROTH BROS., 451 W. Adams St., CHICAGO, ILL. NEW YORK OFFICE: 136 Liberty Street.

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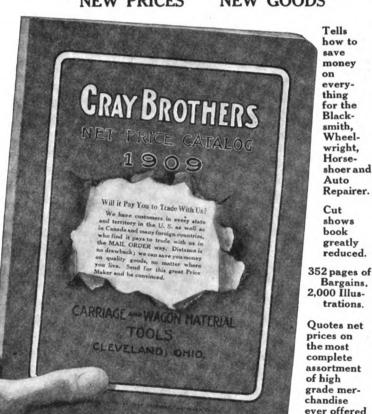
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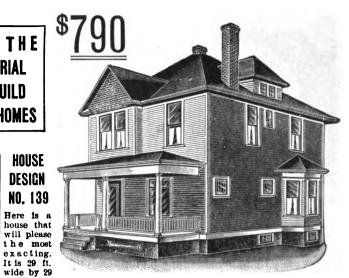


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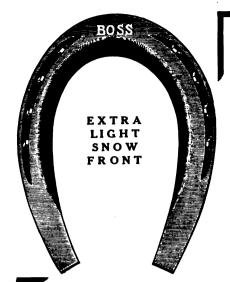
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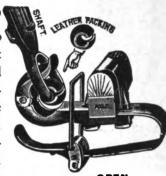
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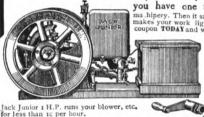
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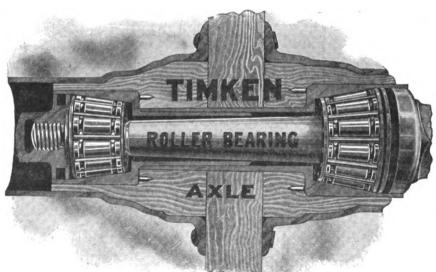
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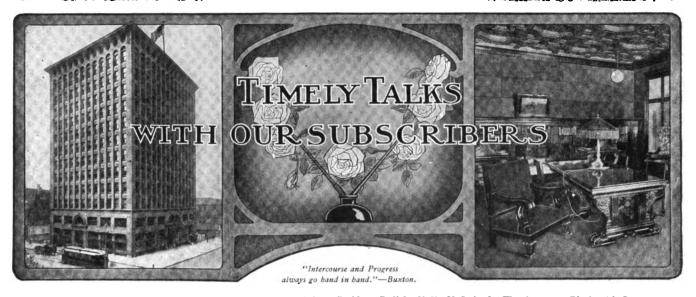
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Duly entered as second-class mail matter at Buffalo, N. Y. Act of Congress, March 3, 1879.

William F. Wendt, President.

Albert W. Bayard, Secretary,

Submitted B. S. Sallows, Associate Editor.

Submitted B. S. Sallows, Associate Editor.

The American Blacksmith Company, U. S. A., by The American Blacksmith Company, Act of Congress, March 3, 1879.

Walter O. Bernhardt, Editor.

Arthur C. Barnett, Advertising Manager, Gilbert Falk, Ass't Advertising Manager.

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Subscribers should notify us promptly of non-receipt of paper or change of address. In the latter case kindly give us both the old and the new address.

Volume Eight,

This issue marks the close of another volume. For eight years has THE AMERICAN BLACKSMITH been read by progressive, upto-date, shop-owning blacksmiths. eight years has "Our Journal" worked and labored for smith craft interests. Never, for one minute, has the paper lost sight of the policy with which it started out, i. e., blacksmiths' interests first, foremost and always. We have aimed constantly to represent the smith, his work, his interests; to improve the paper and to give "Our .Folks" just as much for their money as we could possibly give. We believe that we have left a trail of steady improvement behind us. And we believe that in the future we shall see just as much improvement, if not more, and just as steady. The coming volume will contain many surprises for "Our Folks," and several new departures and improvements will be made. "Our Journal" has always stood for and represented the best of everything along craft lines, and it will always continue to stand for honesty and square dealing.

Canadian Subscribers.

Ever since the advance in postage on all second-class matter for delivery in Canada we have hoped that the arrangement was but temporary and that the subscription price of one dollar could be made again after a short trial of the new order. We are much disappointed, however, as at present there appears to be little likelihood of the advanced postage rate being set aside. We, therefore, call the attention of our Canadian readers to a long-time rate, by means of which they can secure "Our Journal" at slightly less than the yearly rate in force in the United States. While the regular subscription rate on The AMERICAN BLACKSMITH delivered to Canada is \$1.50 per year, by subscribing for a period of five years a special rate of 98 cents per year is made, or \$4.90 for the five-year period, payable in advance.

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Making Steel by the Bessemer Process-

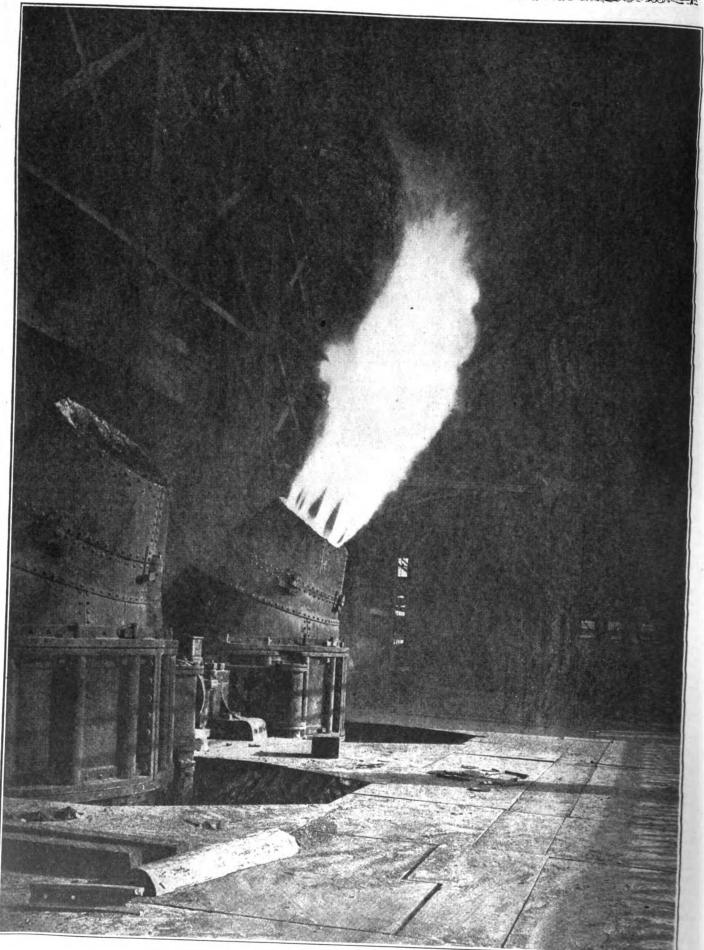
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Trade Education Abroad.

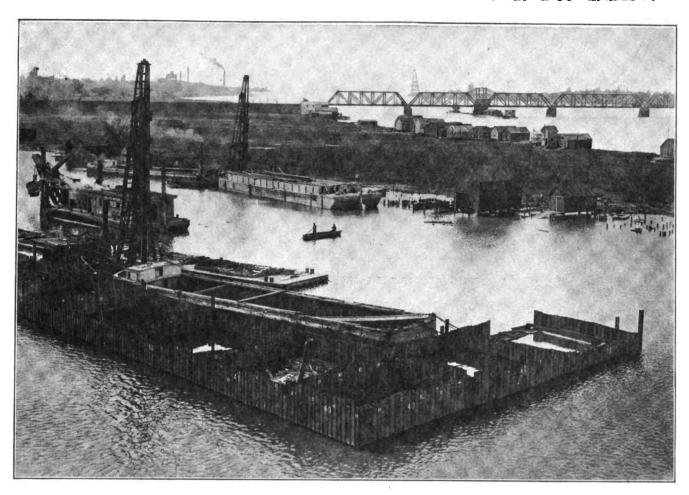
How the craftsmen of tomorrow learn their trades in other countries should interest every craftworker. The instructor in the trade and industrial institution is, of course, vitally interested in trade education abroad, but the active craftsman may well read upon the subject with profit to both self and craft. The series of articles on "Trade and Industrial Education in Other Countries," by Mr. William H. Dooley, begins in this September issue and should interest every one of our readers. Mr. Dooley spent several months of last year in studying the educational problem and its relation to the trade and industries in the various countries of Europe,

For Eight Years.

On page 17 is an announcement that has appeared regularly since the first issue of "Our Journal." The Honest Dealings paragraph has appeared for nearly eight years. Not once has it been omitted in all that time, Not once in all that time have we been called upon to make good to subscribers actual losses occasioned by trading with any of our advertisers. Advertisers in The American Blacksmith are reliable advertisers. The Honest Dealings paragraph guarantees it. You can trade and deal with AMERICAN Blacksmith advertisers without fear of anything but straight, honest dealing. And the Pink Buffalo Stamps work in the same harness. Here's a letter from a Wyoming reader: "Please send me more Pink Buffaloes. It looks to me as though I get better treatment when I put them on my letters." The Pink Buffalo stamps insure honest treatment from all firms with whom you may do business. They insure fair and square dealing from those firms who may not be advertising in "Our Journal." Therefore, see that a Pink Buffalo is placed on every letter you write. It stamps you as a progressive, up-to-date smith.

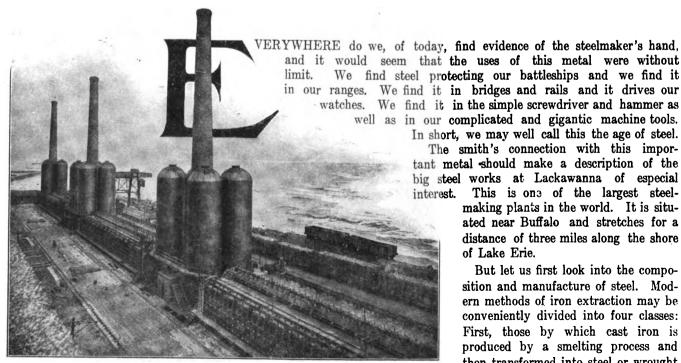


MAKING STEEL BY THE BESSEMER PROCESS



COFFERDAM CONSTRUCTED OF STEEL PLATES MADE BY NEW ROLLING PROCESS

Steel-Making at the Lackawanna Steel Plant



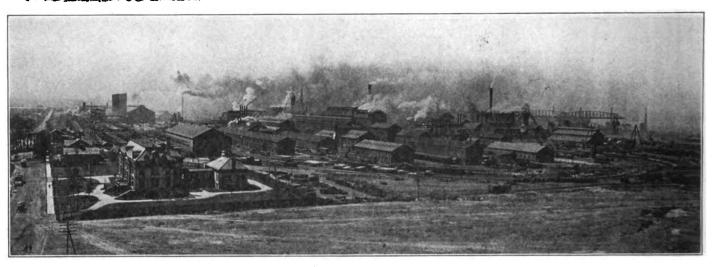
COKE OVENS ON THE SHORE OF LAKE ERIE

well as in our complicated and gigantic machine tools. In short, we may well call this the age of steel. The smith's connection with this important metal should make a description of the big steel works at Lackawanna of especial interest. This is one of the largest steel-

making plants in the world. It is situated near Buffalo and stretches for a distance of three miles along the shore of Lake Erie.

But let us first look into the composition and manufacture of steel. Modern methods of iron extraction may be conveniently divided into four classes: First, those by which cast iron is produced by a smelting process and then transformed into steel or wrought iron; second, those in which malleable





A GENERAL VIEW OF THE LACKAWANNA STEEL COMPANY'S PLANT

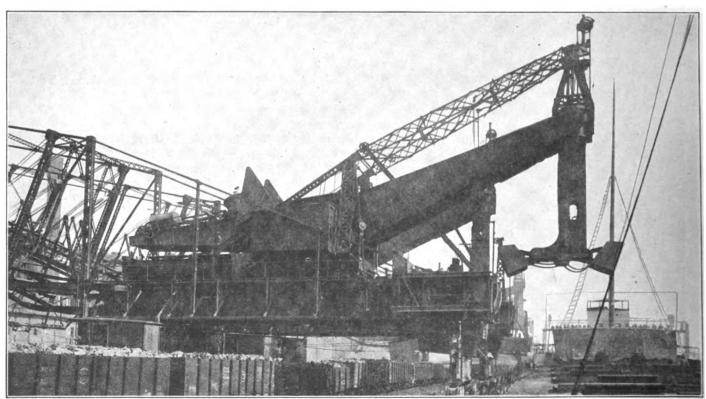
iron or steel is obtained directly from the ore; third, those in which steel is formed from wrought iron; and fourth, those in which steel is finally prepared by an intermixture of pig iron and wrought iron in the fluid state.

The ore, which contains the iron in the form usually of an oxide mixed with various other elements and impurities, is heated by the combustion of coke in a blast furnace in contact with a flux, usually a limestone. The mixture is so proportioned that the impurities for the greater part pass out of the blast furnace as silicious or glass-like slag, the resulting cast iron or pig iron containing from ninety-

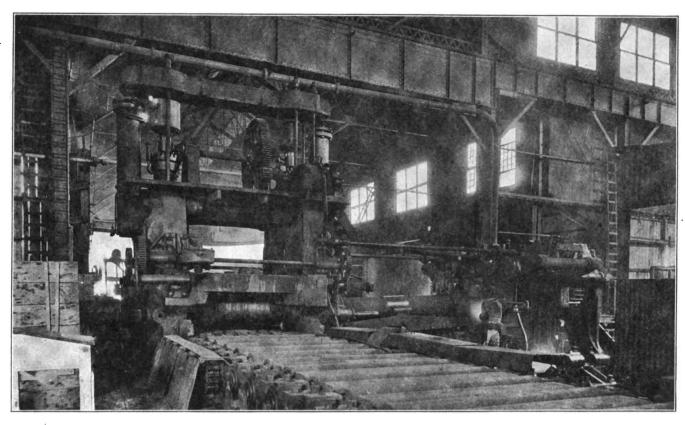
three to ninety-five per cent of metallic iron, three or four per cent of carbon, and the balance of various impurities, as silica, sulphur and phosphorus. It is the percentage of carbon in iron or steel which largely determines its physical characteristics; pig iron containing about three per cent of carbon is a brittle and comparatively weak form of iron. By eliminating the carbon to less than one tenth of one per cent, wrought iron is formed, which is stronger and tougher, being iron in its purest commercial state. By increasing the amount of carbon to onehalf of one per cent, there is formed what is known as low carbon steel;

as the carbon content increases up to one and one-half per cent the steel becomes stronger, harder, more brittle and also takes on the property of hardening which is employed in making steel tools.

In modern practice, the two chief methods of forming steel are known as the Bessemer and the Open Hearth processes. In the Bessemer process, molten cast iron is placed in a large vessel or converter and a blast of air blown through it for fifteen or twenty minutes, which suffices to burn out most of the carbon and many of the other impurities existing in the cast iron. At the end of the blow a



GIANT UNLOADER AT WORK AT THE COMPANY'S DOCK



ONE OF THE ROLLERS WHICH CONVERTS INGOTS INTO PLATES

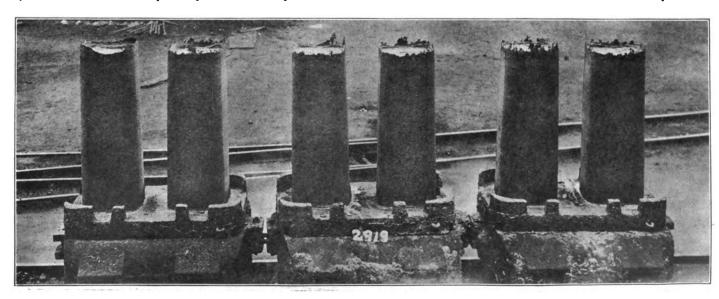
sufficient amount of carbon is added to make the resulting metal of the desired composition. The process is a rapid and cheap one for making lower grades of steel.

In the Open Hearth process, wrought iron and cast iron are melted together in the shallow bath of an open hearth furnace, and their impurities reduced by the flames of burning gas over its surface. This process is slow, but is subject to much more careful control and enables the steel maker to produce steel with precisely the

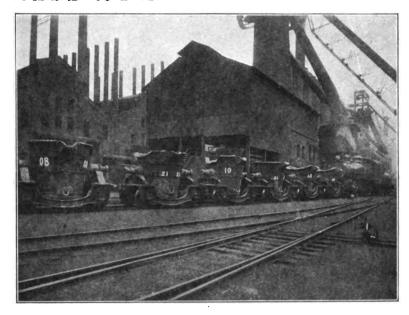
desired proportions of ingredients and alloys.

To visit a modern plant and witness these operations, is indeed a spectacle not to be forgotten. The Lackawanna Steel Company's plant presents an opportunity to follow the entire process of steel making from the time the large steamers from the company's mines near Lake Superior dump their ore in huge mountains of red earth at the plant until the finished product is delivered in the shape of steel rails, steel plates and material of various

other kinds. A remarkable feature is the machinery of huge size and capacity, dispensing with the labor of thousands of men. Traveling cranes and conveyors load the ore, coke and limestone into cars which are conveyed by machinery to the top of the blast furnaces where it is automatically dumped into the capacious maw of those monsters. At each tapping, about four hours apart throughout the day and night cast iron flows with the accompaniment of blinding flashes of flame and smoke from the tap hole



STRIPPED INGOTS ON THE WAY TO THE SOAKING PITS



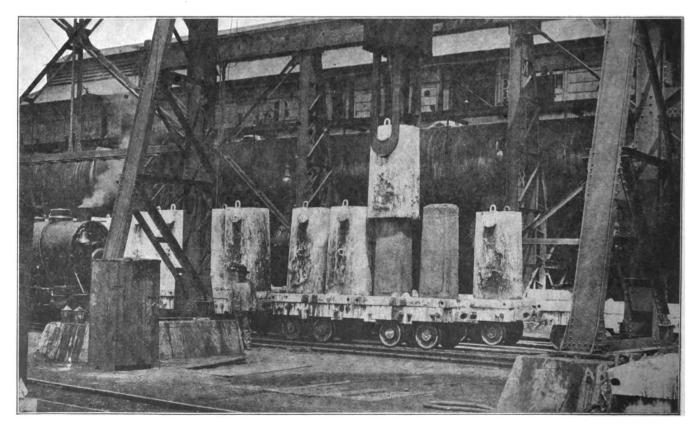
TRAIN OF LADLES FROM BLAST FURNACE

at the base of the blast furnace in a swift stream of molten cast iron to immense ladles or cars just outside of the blast furnace. Small steam engines attached to these cars swiftly haul them to another part of the yard, where the still molten iron is automatically poured out into a series of traveling molds, which in turn discharge the pig iron, hardened, but still red hot, into railroad cars ready for shipment, without the intervention of any manual labor, or else, the ladles are whisked to the

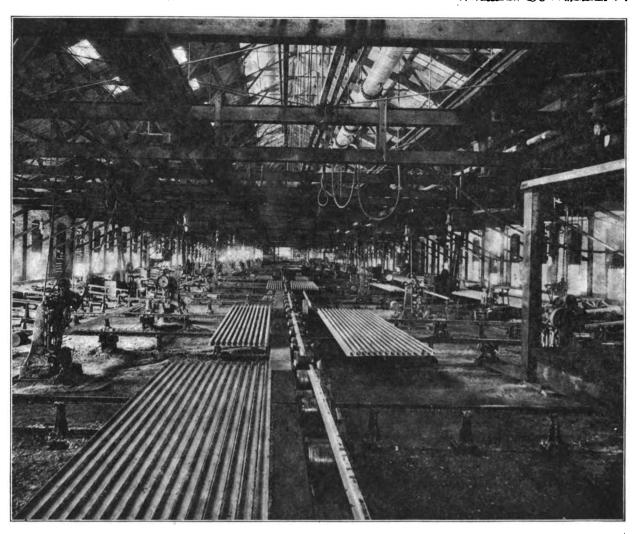
Bessemer Converter plant and poured into the huge converters, ten tons of iron to a charge and there converted into Bessemer steel to the accompaniment of a huge flame and display of fireworks, extending forty and fifty feet up into the air. After conversion into steel in the Bessemers, the metal is poured into large molds, allowed to harden and then by machinery thrust from the molds, leaving the still red and glowing ingots ready for further work. If intended for steel rails for

railroads, the ingots are again hauled to the rolling mill furnace, in the intense heat of which they are allowed to soak and come to an even temperature throughout, before being rolled. In the rolling mill, the ingot passes through successive rolls, getting smaller in cross section, and increasing in length with each passage, shot from one roll to another, and finally run into the cooling yard as finished rails, handled entirely by automatic machinery and without being touched by men in any way. Large circular saws cut off the ends of the hot rails and saw them into proper lengths as if they were so much wood. In the bloom and plate mill, the processes are conducted in the same splendid way in a tremendously large and rapid scale, invisible hands throwing the levers which control the movements of the glowing red-hot masses of iron back and forth through the various stages of its manufacture.

Some faint idea of the grand scale upon which steel is manufactured in a plant of this kind may be gained from considering that the Lackawanna Steel Company mines three million tons of coal yearly for its purposes, two millions of tons of iron ore, and produces tonnage of steel products per year of over one million tons, employing twelve thousand men with



AUTOMATIC STRIPPER TAKING THE MOLDS OFF RED HOT INGOTS



FINISHING SHED SHOWING METHOD OF CONVEYING RAILS

a total pay roll expenditure of ten millions of dollars. A total of over one hundred and fifty thousand horse-power is employed in the various operations of the plant, in which are also ten miles of narrow-gauge track, and thirty-two locomotives operating within the works and between the various mills.

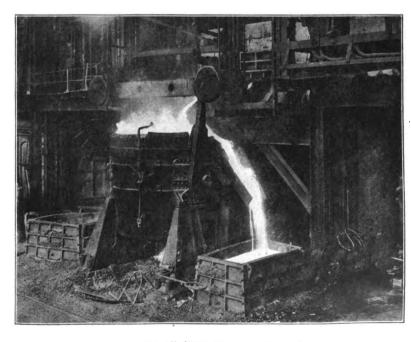
Several days would be required to carefully visit and inspect all the mills and operations of this immense plant. The lesson which it teaches is how labor-saving machinery on an immense scale makes it possible for a comparatively small number of men to accomplish that which would have been an utter impossibility not many years ago.

The New Blacksmith Shop for the Central at Albany.

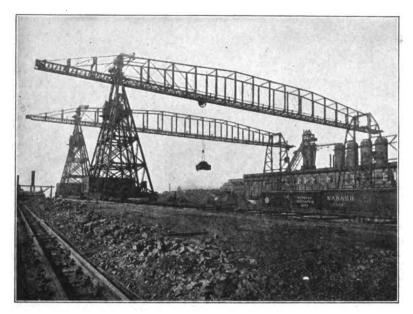
Plans have been prepared and work started on what is said will be the biggest blacksmith and machine shop of the entire New York Central lines system. The shops will be at West Albany, N. Y.

The building will be one hundred and fifty feet wide and six hundred feet long,

and will be built right over smaller structures, now used as blacksmith and machine shops. The plan is not to disturb these buildings or the machinery in them any more than possible during the erection of the big shop. Because of the rush of work it would seriously hamper the shops if the machines had



TAPPING AN OPEN HEARTH FURNACE



TRAVELING BRIDGE CRANE FOR CONVEYING ORE TO FURNACES

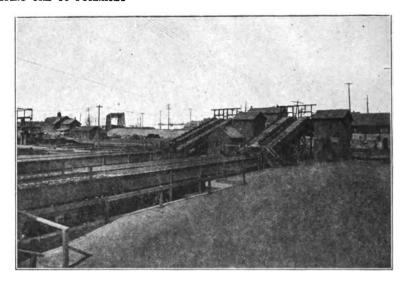
to be stopped for even a day or two. As a result the hammering and roar of machinery in the repair of steam engines will be going on at the same time that the walls of the new building are rising up around them.

The walls of the old building, however, will be gradually torn down, but the machinery will be left standing right where it is until the new structure is completed. Then it will be rearranged and the new machinery put in to fit the increased capacity as quickly as possible. Glass will enter largely into the construction of the new building, making up the lower part of one side and the two ends. The remainder will be of modern steel and brick work. The reason the building is to be erected

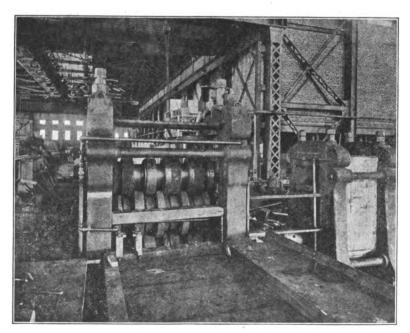
is because of the increased work which is being done at West Albany, and the fact that a big growth in this work is expected within the next year. It will necessitate the employment of many more men than are at present at work.

This building, which is expected to be finished before December, will complete the erection by the Central of four large new shops at West Albany within the last few years. The others are erecting shops one and two, and a new boiler shop, the four forming a letter M. A new power station, with double the capacity of the old one is now in course of construction, and it is expected it will be completed in the fall. The boiler and machinery are now being installed at the station.

An idea of the size of the new blacksmith shop may be had from the novel



FROM LADLE TO CARS. ENDLESS CHAIN-MOLDS FOR PIG IRON



FROM THESE ROLLS THE RAILS PASS TO THE COOLING SHED

method of constructing it directly around and over the old shop, thus practically housing in the old building with steel, glass and brick.

A Practical Talk on Brazing. A. W. LOVEDAY.

It is a very simple thing to cramp the work together and do all Mr. Utz says he does and have a failure, but if he reflects a little he will find it is avoidable in most instances. First, he should clean the break and then mix the compound with spirits of wine and smear it well over each broken piece and see that it takes well to it, and if it is greasy the best way is to make it red-hot and go over it again when cold. Then clamp it together; but I seldom find castings the right shape for that and have to rig up some other plan, such as a piece of iron with holes in and use hook bolts; they are preferable, as I find if cramped

they may hold too tight in the cooling. The shrinkage is often too great and will part just when the spelter is in most brittle state, that is, a dull red. I notice that he makes the same mistake as most all do in brazing; that is, he does not put the borax, or flux, on the spelter as well as under it.

Now, I will give you a good plan for all spelter brazing. First, heat piece to dull red and put on borax, return to fire and flow it thoroughly; then put on more borax and when that has settled down, or the whole of the water of crystalization has been drained off (if not done previously on a hot pan) and you are sure it won't leave the iron, put as much ground spelter as will stay on it. Add more borax and another dust of spelter and another of borax on top. Be sure you put borax on last, as this is very important. When the heating part comes, it will flow long before it would without it. If placed in the fire as directed it will be seen to flow at a low heat and if cast, or malleable cast (which should always be treated as cast), it should have a little time to soak through joint. If an awkward joint, turn it over and do it on reverse side. Of course, a torch or blast lamp should be used on top, after the bottom heat has been raised to the proper temperature. I always use charcoal for brazing, as that will give best results as it does not heat

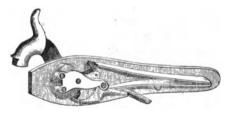


FIG. 1.—THE BACK ACTION LOCK

too quickly and has a knack of giving an even heat on top as well as bottom if you wait long enough and keep slightly blowing it up and waiting.

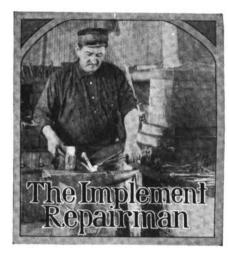
If brazing cast brass, a good plan is to do as directed and put a good cake on it, and when it is ready to flow have a strip of galvanized sheet iron about one inch wide in your hand ready at that moment and just smear it over the braze. The zinc will flow the spelter quickly and the wrought iron will



FIG. 3.—THE FRONT BAR ACTION

counteract the copper in the spelter and cause a splendid brazed job that anyone would be proud of. This last is an experiment of my own and is invaluable in brazing brass or copper.

In using a blast lamp always place a piece of charcoal above and at the back of the job, so that the blast refracts off it to the job, and that increases the heat two hundred per cent.



Gun and Novelty Repairing-8.

W. G. MUMMA.

Work on Locks.

The locks of cheap guns, with the exception of the springs, are made of malleable iron or a cheap grade of steel and some are case-hardened. The locks on the high-grade guns are made of the best tool steel and are hardened in the same manner as good tools. The springs are of the best spring steel and the workmanship is of the best quality.

The locks of the muzzle-loading shot guns and of rifle guns are of three distinct styles: Back action (Fig. 1). front action (Fig. 2) and front bar action (Fig. 3). The back action has the main spring back of the hammer. The front action has the spring in front of the hammer, and the front bar action has the main spring in front of the hammer, and the lock plate has a bar to fit against the barrel. The double barrel breech-loading shotguns are most all fitted with front action locks. Some breech loaders are made hammerless, while some are fitted with the hammer in the center of the breech and all works inside the stock. A gun supply catalogue will give one a good idea of the various locks. A gun lock consists of thirteen pieces in all: A hammer, a lock plate, a main spring, a sear spring, a tumbler, a sear, a bridle, a swivel, a tumbler

screw, a cross screw and three small screws to hold the bridle.

The repairing of each part will now be considered. First will be the hammer; sometimes a hammer will have to be replaced. Hammers can be had ready made, but it is sometimes difficult to get an exact duplicate of the old one. If the hammer is cracked in any part it can be repaired by filing out the crack, then fit a plug and braze with hard solder. If a small part is broken off it can be fitted on by filing a dovetailed notch and then brazing. A hammer can be forged out of a piece of good steel 3-inch wide and %-inch thick. (See Fig. 4.) Forge the end A out for about one and a quarter inches, then cut C out as shown at dotted line, then bend it out at right angles as shown at C. This is the thumb piece. Then bend B out at right angles to A. Now cut off at X. You now have the hammer in a rough shape. Then round up all the corners neatly, offset the top to right or left according to side the hammer goes on and file up and finish as shown by the dotted lines or to the shape of the old one that is to be duplicated. Now drill out the cup in the striker and locate and drill out hole for the tumbler post which has to be squared up to fit the square part of tumbler post. It will take some



FIG. 2.—THE FRONT ACTION LOCK

practice to get a good job. This method is applicable only to old-style hammers for muzzle loaders. The hammers for breech loaders can be forged out, but it is a more difficult job. A hammer for any make of breech loader can be bought ready made and in exact duplicate. By making any

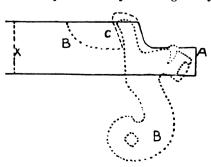


FIG. 4.—HOW TO FORGE A HAMMER

hammer or any other part it saves delay in sending for parts.

About all that ever will be required on the lock plates will be to clean and polish up which is easily done by using emery paper.

If the bridle should become broken it can be brazed, but it seldom is

on the spring and let the hammer down, when the spring can be lifted off. Then take the hammer off, then the sear or dog and spring and then the bridle is taken off when the tumbler can be taken from the lock plate. If you haven't a spring clamp use a piece of steel or iron, file a notch as

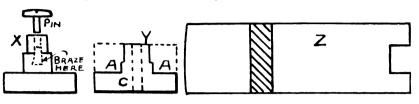


FIG. 5-TUMBLERS AND A SPRING CLAMP

required to do any work on this part. Tumblers can be bought ready made. but the difficulty is to get one to match exactly the one you want to replace. If one has to be repaired it can be done so by brazing. They generally break at the square of the post where the hammer fits on. They can be repaired by fitting a new piece on the post as shown in Fig. 5, X. It is then brazed on with hard solder. Soft solder will not do for it will not stand the hard blows that the hammer receives when striking. If this job is done right it makes a solid joint that will stand. A new one can be made from a piece of hard tough steel. Get a piece of the right thickness and drill a hole through it the size of the tumbler screw, Fig. 5, Y. Then mark off the old one as a pattern, the hole being the guide and center for the post and then saw out the blocks A A, leaving the post stand. Then file up roughly and chuck it in the lathe with the hole as center and smooth up with the file until the post and bodypiece C is of the right thickness. Then file the body piece the shape of the old one, with the sear notches filed in and the swivel slot sawed out. Now put it in the lock and test it to see that it works properly. If it does, take out and harden. Thread the hole for the tumbler screw and have the post rather soft.

Swivels can be easily made or they can be had ready-made, which can be made to fit without much work.

The methods of making screws that belong to the lock will be considered in the chapter on screw making.

To clean a lock, soak in benzine awhile and then take apart and rub and scrape all dirt off until clean. The main spring is the first part to be taken off. Do this by cocking the hammer back, then use a spring clamp

shown in Fig. 5, Z, which can be placed on the spring instead of the screw clamp.

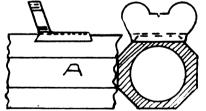
Making and Adjusting Sights.

The rear sights are always made of iron or steel. The front sights are made of German silver and silver, and yellow brass, with an iron bed piece. Silver makes a good sight, but in bright sunlight is apt to glisten too much. German silver is better, but yellow brass makes an excellent sight; bright sunlight does not affect it very much. Some of the patent sights have an ivory bed set in the iron body of front sight. It makes an excellent sight for some purposes.

It will not be attempted to give any description of the large variety of the patent sights used for long range at targets, with their elevating rear sight, as it will be the common sights, both rear and front with the rear sight set solid on the barrel that the gun and novelty worker will mostly

glued on. Where the notch is, ream out in front with a small round cherry until top edge is quite thin, say about 312-inch thick. Then cut the notch with a very fine file with a thin edge or the edge of a rather dull knife blade. Make it large enough so that a medium-size needle will fit in, file out a place in the barret deep enough with dovetailed sides so that the sight will fit neatly in a little higher than the barrel and drive the sight in moderately tight. The sight is now ready for use. Proceed to make the front sight as shown in Fig. 6, B. Make the bed piece first out of iron or steel, drill a small hole in center for the piece of brass or silver to fit in and cut a place in the barrel about 56-inch wide and 373-inch deep about one and one-half inches from end of barrel. Fit the piece in having dovetailed sides as shown. Now make the sight proper. say of a piece of brass so the top will be about one-fourth inch above the barrel. Have it about $\frac{7}{32}$ -inch thick. Fasten it in bed piece by filing a small projection on one side so as to fit the Then soak it with soft solder. Now file and finish it up so as to make a tight fit on barrel. Make it about one-fourth inch above the barrel with the notch in the rear sight the same height. Don't make the top wide, but rather thin of the same width as the notch. A wide top and notch will make the gun shoot bad. After the sights are finished the rear sight should be blued and the bed piece of front sight also blued. If the sights are made too low on the barrel they won't

emery paper wrapped on a stick or



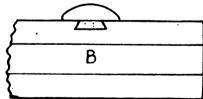


FIG. 6-ADJUSTING GUN SIGHTS CORRECTLY

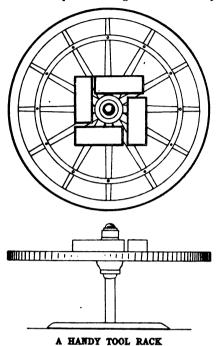
deal with. For short range shooting this kind of sight is the best for when once adjusted correctly they will always stay so. For different distances at long range it is necessary to have elevating rear sights.

We will first begin with the rear sight which must be made from some good piece of steel or iron. Make the sight solid as shown in Fig. 6, A, about $\frac{3}{12}$ -inch thick. File it up smoothly with a fine file, then finish with fine

be seen so well as the barrel is apt to obstruct the line of vision. It is much better to have them set high for they can be seen much better.

The sights after being finished and fastened on barrel are now ready to be adjusted. Proceed by first putting up a white piece of paper about three-quarters inch in diameter on some dark object for a mark, at a distance say of about twenty-five yards. Now take the barrel, loosen from the stock.

fix it up on some rest and sight through the bore of barrel at the mark. It will appear a small white spot. Then, without disturbing the barrel in the least, sight through the sights and if both correspond the sights are correctly



set, but if the sight is too high file the front sight down a little until it sights on the mark. If the sight is too low file or work the notch in rear sight down until it sights on the mark. Very little working down will do in either case. You now have it correct as for height. If the sights are to one side of mark say to the right, move the front sight to the left or in the opposite direction as to which side it is. Move the rear sight in the same direction to which side it is on the mark. When the sights are correct as to height and side views they should exactly coincide with the sight through the bore of barrel, provided you use your eyesight correctly. Then give it a further test by shooting at a mark about a dozen times from some good rest and if it shoots incorrectly adjust the sights until the shooting is correct. Very often but little adjusting will have to be done. The sights for double barrel guns are placed on the ribs and the barrels are so fitted together that the sights answer for both barrels at a certain distance.

(To be continued.)

A Handy Tool Rack Easily Made. FRANK H. PECKHAM.

The accompanying engraving shows a very handy tool rack that can be

easily made by any smith. I took an old buggy wheel and attached a strip of wood to the spokes all around about two inches inside the rim on every side. I then took four wooden boxes and placed these on the spokes near the hub. These boxes I use for chisels, punches and short tools. The spaces between the rim and the circular strip I use for hammers, swages, cutters and the like. The spokes inside the circular strip I hang my tongs on. The wheel is mounted on a suitable stand with supporting legs of good size so the stand will not tip over. I have it near the anvil within easy reach. When I see what I want, a turn of the wheel brings it under my hand. The cost of this stand is so little it's not worth considering, and any smith can make it in a little spare time.

The Smith and His Work-6.

BY ROBT. B. KERR.

Treatment of Cast Steel.

In forging cast steel the most important part is in the heating, so the smith must see to it that his fire is in proper condition. Have a good, solid fire, with plenty of coke between the blast and the steel. Being very dense in structure, it absorbs heat slowly, so be moderate with the blast. It is absolutely necessary that the steel be heated clear through. Do not be deceived by a surface heat. If not given the proper time in the fire the inside of the piece will be considerably colder than the

same; the former as above stated, and the latter ruination in the very last operation to what is often a very expensive piece of work.

Steel being of various degrees of temper, which means that it contains various percentages of carbon, according to the purpose for which it is made and the fact that the more carbon it contains the less heat it will safely stand, makes it necessary, or at least desirable, that the smith should know just what the steel is before starting to work it.

To a certain extent an experienced man can tell the carbon content of a piece of steel, but it requires careful study and intelligent observation, and even then the most experienced are sometimes deceived.

To test: First take a piece known to contain a certain proportion of carbon, say one per cent. Break it cold, cutting only two sides, so as to show fracture to the surface. Examine carefully, if with a good magnifying glass, so much the better; note the thickness of the skin, the fineness and regularity of the grain, and the appearance of the fracture, whether dull, or bright and sparkling. Compare it with the piece you wish to test, remembering:

First, the thicker the decarbonized skin, the less carbon.

Second, the finer and more regular the grain, the more carbon and the better quality.

Third, the molecules of first-class, highly carbonized steel are round and present a smooth, dull appearance on

Percentage of Carbon	Characteristics	Suitable for
1.50	Very difficult to forge, easily burned and will not weld properly.	Razors, very fine machine tools, engraving tools, fine drills, etc.
1.20	Welds with extreme care; do not heat above cherry red.	Fine machine tools, saw files, scrapers, surgical instruments.
1.00	Good, high-grade steel; work carefully.	Drills, taps, dies, wood-working tools, cutlery, fine lathe tools, etc.
. 80	Excellent, all-around steel. Welds readily with care; moderate red heat.	Lathe and planer tools, chisels, punches, shear blades, dies. Suitable for all general purposes.
.70 to .60	Mild working steel. Welds easily, bright, red heat.	Drop forging dies, track chisels, smith tools, hammers, well tools, rivet sets, and all work of a similar nature.

THE PROPER STEEL FOR VARIOUS USES

outside and any attempt to forge it will create strains that will most certainly lead to trouble later on, especially if the job has to be tempered.

Improper heating and careless forging is the chief cause, far more so than tempering, of cracks of every known variety. They can be called by any name—temper cracks, water cracks, surface cracks, pipes, etc., but the cause is usually and the effect is always the

fracture, and this feature will be noted with the same steel of a lower carbon, except that the grain will not be so fine. Inferior steel, on the other hand, has a grain of a crystalline structure and looks bright and sparkling.

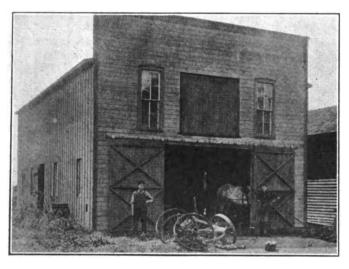
These points are useful as far as they go, but, really, neither the quality of a steel nor its carbon content can be accurately judged by the appearance of the fracture of a bar, as it comes from

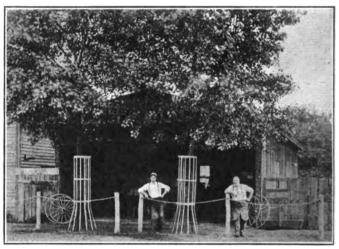
the rolls, the same depending largely upon the heat at which the bar has been finished. Long bars will frequently show entirely different fractures at opposite ends, although tools forged from it will, when finished, be alike in every respect.

There is, however, one point that is unchangeable. The more carbon steel contains, the lower the heat at which it can be made to harden, and it is a safe rule to follow that before starting to strains, which, although they will not show in forging, have an unpleasant habit of making their presence known later on.

To illustrate this point. Suppose you take a piece of round cast steel, give the end of it a quick surface heat and begin drawing it out with light blows all round. The outer surface will draw away, leaving the end of the bar cup-shaped. Now, harden the end and attempt to draw

why upsetting was injurious, nor can I recall any specific case in my own experience where it resulted in injury, except that it loosens the grain. It is, however, at the best, an uphill business and should not be resorted to except where absolutely necessary, and then see that the heat is uniform. After the piece has been upset sufficiently, hammer well to pack the grain and thus restore the steel to its normal state.





A KANSAS SHOP RUN BY MR. W. C. WATT

MR. B. B. MALLORY'S GENERAL SHOP OF OHIO

work up expensive tools from steel of an unknown quality a piece of the steel be taken and tested to find out how low a heat will give the requisite hardness. Take a piece of the steel to be used, hammer it out about one inch wide and one-eighth inch thick, temper to a chisel blue all over and when cold break it off in little pieces. A little practice will enable a man to tell just where he is at and whether the steel is of good quality or not. This will often save annoyance and loss.

In forging see that the heat is uniform. If flat or square stock is used look out for corners or edges that they don't get too much. Do not let the work lie in the fire any longer than is necessary.

Allowing steel to "soak" in the fire is more injurious to it than any other process known. In fact, a piece of fine steel left overnight in the fire, or furnace, is almost useless. It will show a coarse crystalline fracture, will be dry and brittle and will either fly to pieces in tempering, or will not temper at all—certainly not uniformly.

In forging a piece to shape use a heavy hammer. If a power hammer is available, so much the better. If not, see to it that the blow struck is severe enough to penetrate the work, so that it draws equally all through. It will then be uniform in structure and free from temper; the outer surface will most likely crack in circles and in some cases will peel off from the core, owing to the strain created by an irregular displacement of the particles, of which the steel is composed. This is, of course, an extreme case, but is exactly what happens in a lesser degree with any piece that is irregularly heated, or is forged with blows not powerful enough to cause equal displacement of the stock all the way through.

For the same reason wherever practicable draw steel equally from all sides and do not let it spread too much in any one direction, even if there is plenty of power at hand to drive it back to place. The effect of this will often be seen in cold chisels which when tempered will crack in half circles and the blame is usually laid on the steel whereas it is the result of improper forging.

Reheat frequently. Do not try to do too much at the one heat, or to work steel after it gets below a dull red, even if you have plenty power; stop whenever the metal ceases to work freely under the hammer. Pounding half cold steel is a thankless task and, being injurious, is worse than useless.

There is a wide-spread prejudice among smiths against upsetting cast steel, but I have never met a smith who could give a satisfactory explanation of Steel up to one hundred point carbon can be readily welded; above that the utmost care must be taken. Fortunately, however, high carbon steel is usually made up into fine tools, and it is rarely necessary to weld them, and, as a matter of fact, welds in steel of from 1.25 to 1.50 carbon are, even when accomplished, of very doubtful utility.

Welding was treated in a previous chapter and it is not necessary to further refer to the subject, except perhaps to emphasize on the matter of heating, which is the all-important thing in welding and is doubly important in working so delicate a material as high carbon steel.

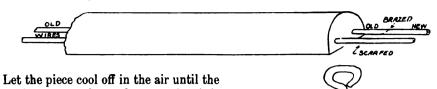
If you would weld cast steel, a clean, clear fire, a slow heat and unceasing watchfulness are necessary. In heating and forging always bear in mind that those operations are the foundations upon which the success or otherwise of the subsequent tempering rests.

All cast steel forgings should after being completed be carefully annealed, not alone to make them softer, but to remove the strains that have been contracted during the forging process.

Bring the piece slowly up to a dark red heat—no more; be sure it is uniform. Bury in unslacked lime or charcoal, a box or barrel of which should be in every shop. Let lie till thoroughly cold.

When a small forging is wanted in a hurry and there is not time to let it anneal in the regular way, what is called water annealing is often resorted to.

it has to be fished out again. A horseshoe fork may be made out of a few pieces of 56-inch round iron, welded to a stem, according to taste and require-



red heat can no longer be seen when it is held in a dark place, or until you cannot see the reflection in water. Quench in tepid water, or, better still, in soapy water or oil. This method will make steel soft enough to cut, but will not remove strains.

A good, quick method of annealing very small pieces is to place them between two pine boards and tighten up in a vise. They will cool sufficiently in a few minutes.

High Speed Steel.

The alloy, generally known as highspeed steel, is now very extensively used for machine tools of nearly every kind. It is composed of various metals in conjunction with steel, its composition varying somewhat in the different makes. The chief ingredient, however, and that which contains the hardening property is Tungsten, a hard, heavy metal of a grayish color, which when mixed with steel forms a mass of extreme hardness.

Unlike carbon steel, this material should be forged at a bright yellow heat. Owing to its extreme density, it absorbs heat more slowly than cast steel, consequently, should be heated slowly.

Two Labor-Saving Hints. DAVID W. MATCHETT.

As a subscriber much interested in the columns of "Our Journal," especially with regard to the articles contributed by our fellow craftsmen, I beg to submit the following "kinks" for the benefit of others, suggesting at the same time that some of those who give them a trial will have something to say as to the advantages and disadvantages

as the case may be.

Having a considerable quantity of rubber tire setting in my business, I devised a handy method of renewing the steel wires. According to the engraving it will be observed that I scarf and braze the two ends of the old and new wires together, then, on withdrawing the old wire, the new one is drawn on at the same time.

To me, it has always seemed a sloppy habit to throw horseshoes into the slack trough; then when one is wanted, invariably when moments are valuable,

TWO LABOR-SAVING HINTS

The fork is placed in the trough ments. and the shoes let fall around the stem of the fork. Thus, all the shoes in the trough may be lifted up and the ones required taken off.



"How are smiths generally getting along with their side-lines''? asked Benton, as he dropped into his chair.

Very well, Benton. As I told you some time ago, it is necessary for the smith to carry a side-line in some localities," and the Editor took a bundle of papers from a corner of his desk. "Here are a few odd letterheads that I have gathered in the past few months. It is interesting to glance over them and see the lines that some smiths take up. Of course, it is up to the smith in a great many cases to fill the needs and wants of a community. Not long ago, one of our readers told of his shop being used as a Sunday School room; they used the anvil for the bell."

"Well, that's interesting," said Benton. "I don't suppose there are many lines that the smith does not take up."

"There are few, if any, lines that the smith has not taken up," and the Editor

read from the pile of letterheads-"Here is a smith who, beside doing a blacksmith and general jobbing business, is also a dealer in groceries and table supplies. Here is another man who deals in groceries, hardware and farm machinery. He buys produce and handles general merchandise. Here's a reader in far-away Australia has 'Machinist, Wheelwright, Carpenter and Undertaker' under his name. This man also announces on his letterhead that he is agent for an insurance company and handles farm machinery and paints and oils. This smith located in the South, is a 'Miller and Blacksmith,' according to his letterhead. Here is a man who is an undertaker, liveryman and grain merchant. You see, Benton, there are few lines that our readers don't take up.'

Then, picking up another sheet, the litor continued: "This man's letterhead Editor continued: says that he deals in wagons and buggies, wall paper and paint, does vehicle repairing and handles furniture and funeral goods. Here's a man who announces a full line of funeral supplies. Here is a Georgia smith whose letterhead tells us that he has a 'Blacksmith and Pawn Shop-Repair and Pawn Anything from a Shoestring to a Locomotive.' Here's a smith in the West who makes a specialty of everything. He has a hotel and also a livery stable, and does all the regular work that comes to a smith shop. Undertaking, by the way, seems to be a common side-line among smiths in some sections.'

"Yes, I noticed that undertaking is mentioned quite often," returned Benton, handing the letterheads to the Editor. "I suppose, though, that it is because of the low death rate in some localities.'

McMullen came in at this moment and after shaking hands with both the Editor and Benton asked the latter for some pointers on welding spring steel.

"I can't give you a whole lot of information, but I'll do the best I can,' Benton reached for his receipt book. After turning several leaves, he continued, "Here is a simple receipt for a compound that is used the same as borax. Mix thoroughly two ounces of carbonate of iron and three ounces of black oxide of manganese, with one pound of finely pulverized borax. That is said to be an excellent compound for welding spring steel. Here's another for welding spring steel. I got this hint from Dick Radcliffe, down near Lawton's. I dropped in on Dick one afternoon and found him hard at work on a big job for some contractor. I watched him for a while, but couldn't get onto what he was doing, except that he was welding some kind of steel. He would take two flat bars from a pile already cut to size, lay them in the fire in position for welding, and when very near a welding heat, he placed a piece of stove pipe iron on the joint, let the piece melt and run in the crack and then he would weld it up on the anvil. When I asked him about it he said he was welding spring steel and that the small pieces were cut from a Russia sheet iron stove pipe. Said he'd been welding spring steel in that way for years."

That seems to be a simple and easy way to weld what has always been a very troublesome job for me. Guess I won't have any more trouble now," and McMullen bid Benton and the Editor good-day.

The Blacksmith's Love.

W. O. B.

A shapely Venus did'st thou say?
Ah, gaze, and check your haste.
Oh, man! Hast beauty in thy eye?
Can'st tell a shapely waist?

Then look upon a face so rare,
'Tis rapture, joy, delight;
'As smooth as velvet to the touch—
Intoxicates the sight.

Hast heard St. Peter's bells in Rome?

If not, then none can tell

Thee what a voice my fair one has—
I'll say 'tis like a bell.

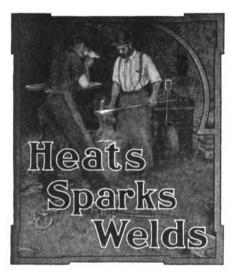
Woulds't slyly glance upon a heel?
Gaze not too long, I pray.
I know 'tis neatly shaped and well.
But sometimes sense will stray.

Such witching charms as these, think you, Not bring love to the heart? Enchantment binds me hard and fast— Sweet bonds we do not part.

Say'st thou that love ne'er touched thy heart?

'Twould do thee no great ill, If thou but had'st a love like I—Love for an old anvil.

Written expressly for THE AMERICAN BLACKSMITH.



Your helper won't quit you just at the busiest time, if a gas engine is your helper.

Make a business of attending to your own business. Then you'll have more business to attend.

A good workman watches his work, not the clock. A long day's work makes a long day short.

An old, patched bellows may be better than nothing, but a modern, up-to-date blower is best.

Most businesses will stand a big heap of prodding before they'll balk. Now is a good time to prod.

Any boy can sell a fifty-cent article for thirty cents, but it takes a salesman to sell goods at a profit.

Right this minute, write to the Secretary. It's not too late to organize, even now. But don't wait another day.

Of two men which is most likely to succed, the one who knows the most or the one who sticks closest to his work? You are in business for profit—profit must come from customers—customers should have your first consideration.

'Tis commendable to keep expenses down but don't let the business vehicle go to pot for want of a few nuts and bolts.

John Hogan says: 'I generally notice that the feller that cuts prices on shoein' don't know much about cuttin' hoofs.'

Knocking your competitor is like tossing a ball against a brick wall; the harder you throw the quicker and stronger it comes back.

If there was a newcomer in your neighborhood, would you have made a business call? Or do you wait for new folks to call on you?

Work turned out a little earlier and a little better than called for is worth a little more. It may mean a little effort, but it's well worth it.

"Did you ever hear of a man failing in business who knew the business, paid attention to it and was temperate in all things"? asked Thornton.

"A little lame" usually knocks a big piece off the selling price of an otherwise valuable horse. It's up to the shoer, generally, to save that big piece.

Examine the wagon carefully before telling the customer what repairs will cost. You can't tell what's the matter with it by looking at its tongue.

A little hole in the roof can do a lot of damage, especially if it is over expensive machinery. But then, Tom Tardy has no expensive machinery.

When a man's business grows faster than his ability to run it, failure has perched on his shoulders, and it were better for him to quit before the crash.

A big, fat roll of money will the farmers "salt" this season. Before they put it where you can't get it, present your bill and insist upon payment.

Read every page of "Our Journal"? Better go through it again—and don't forget the ads. There are several extra profit opportunities in this issue.

The three hundredth anniversary of the landing of the Pilgrims at Plymouth, Massachusetts, will be celebrated by a World's Exposition in Boston in 1920.

A good chance for good profit is presented by the automobile. Of course, you are prepared to take care of all the horseless vehicles that come your way.

The good will of customers can only be gained through good work. The good will of customers when once gained is the business man's best investment.

Don't do it. It simply leads to misunderstandings and disputes and accomplishes not one thing. Avoid "talking politics," if you are in business for business.

How's your herd? Don't let your supply of Pink Buffalo Stamps get so low that you are ever entirely out. Send for more just before you need them—we've lots of them.

The last number of volume eight is this. Will you allow another year to go by without saying something to your brother craftsmen in these columns? Let us have your letter for the next issue.

The long winter evenings present excellent opportunities for improving your craft knowledge. Ask our book department for help in selecting craft books. The long evenings will soon be here.

Some business men and some smithseem to forget that the one and only reason for business is profit. And still otherallow the sight of profit to blind them to their obligations and promises to customers.

The more you know about it, the more you know what there is to know about it. You can't learn all there is to know of smithing in a month, or a year. Veterans with half a century of shop experience are still learning.

"Hardly worth while to clean up shop. You see, I no sooner get things in placewhen a job comes in and the shop is turned up-side-down again in getting stock and tools and things together to do the work," and Tom sauntered off toward the river.

Who owes what? Of course you know. Keep a constant finger on the pulse of your business and you'll never need to call in the doctor. A business cannot be run on the money outstanding. Keep collections to the very lowest notch by keeping after the slow payers constantly.

He's got the money in his jeans;
The farmer's flush right now.
He's sold his corn and grain and stuff,

And has a full hay mow. You'd better foot up his account, Present your bill today.

Get your coin while his smile is broad—
A smith deserves his pay.

Atlantic City will soon boast of a smith shop de luxe. Mr. Hugh Genoe, tax assessor and horseshoer, plans for a marble structure of Gothic design, with a floor of concrete and mosaic. Forges and blowers will be of artistic design, with nickel-plated anvils, handsome waiting rooms and Russia leather straps and silver snaps for hitching.

One man alone, though he work for twenty hours out of every twenty-four for all his lifetime, cannot learn all there is to smithing. We must mix our own experiences with that of our fellows—we must read not only what others are doing in our city, but in our country, in the world. Then, and only then, can we gain maximum knowledge of the trade.

Out Dorchester way, Boston, street-car passengers are attracted by a sign: "Gen. Black" painted in big, sprawling letters on a barn. Lots of people have wondered who Gen. Black might be. When you get closer you find that Black is only the first syllable of the word. The other syllable is painted in much smaller letters underneath the "Black," the whole sign reading "Gen. Blacksmithing."

Little Business Stories, No. 1.—Some time ago a man entered a furnishing store. He purchased what he came in for and was receiving his change when the clerk said. very courteously: "If you have time, sir. I would like you to see some new goods we've just received." Natural curiosity held the man and the clerk showed him some goods that were really new. The result was an amount of purchases netting several dollars that would not have been made had the clerk been content to sell only what the man asked for. Furthermore, that clerk very likely gained a new customer for his store. It's not enough to be simply a clerk—be a salesman as well.



American Association of Blacksmiths and Horseshoers.

Did you ever realize, Mr. Blacksmith, that the apprentice problem, the price problem and every other smithing question can be satisfactorily solved by organization? There is not one question connected with the trade that cannot be met and solved by an association.

You wonder how an association can influence more young men to enter the trade? The real reason for the lack of apprentices is the lack of monetary inducement to the young man. Isn't it reasonable to believe that if more money were offered to young men at the beginning that more would join the craft? Therefore, better prices coupled with better craft conditions and the several other advantages and reforms naturally resulting from organization, will influence young men to enter the trade.

But the apprentice problem is not the only craft question that will be solved by organization. Better prices are needed, harmony among brother craftsmen is desired, protection against the slow pay and dead beat is desired, and there are numerous other advantages to be gained.

Have you noticed the steady rise in price of all supplies? Not alone those you require in the shop, but those you need at home. Have your own prices advanced accordingly? Are you getting as much more from the farmer for your work, as he is getting from you for produce? If you don't want to pay the farmer what he asks for his produce, does he sell at your figure? When he tries the game on you, don't cut. Organize and hold up prices all you can.

Talk to your neighbor smiths on this subject. Get their opinions. Ask them to join hands with you in forming an association. Tell them the advantages of organization. Show them how they can get better pay, how they can enjoy better craft conditions. Send for my easy plans for organizing branch associations. You'll be surprised how easily, how simply and how quickly an association can be started in your county. Write me today. P. O. Box 974, Buffalo, N. Y., is my address. Do it now before the snows of winter make the roads impassable.

If an organization will help you tomorrow, it will help you today. The sooner you have an organization, the more it will help you. Why put it off any longer?

THE SECRETARY.

Trade and Technical Education in Other Countries.

1. Holland.



The average manufacturer Holland is very conservative. He hates to be interfered with, and resents the advice of friends. As a result of this attitude one finds very little progressiveness in the methods of manufacture in any of the industries in Holland.

WILLIAM H. DOOLEY.*

The condition of the working class is not very satisfactory. As soon as the Dutch law allows the child to leave the school—which is at the age of twelve—he enters the manufacturing establishment. Although the government has passed a law recently forbidding boys to be employed in manufacturing plants under the age of sixteen, most of the boys go in as soon as they leave school. The hours of

bread and then hurry in their wooden shoes through the quiet streets of the town to their work.

Sometimes they have to return home at eight or half past eight in the morning for a second hurried breakfast, which is as often as not the first, for many of them start the day's work on an empty stomach. Those who cannot run home and back in the halfhour usually allowed for the first "Schaft" or meal time, take their bread and butter with them in a cotton or linen bag and their milk-andwater in a tin, and so shift as well as they can. Dinnertime as a rule finds the workingman, his son and family together in the kitchen. The kitchen is, of course, used for cooking, washing, dwelling and sleeping purposes.

Although Holland is not strictly an industrial country it has numerous industries. One of the principal reasons why there are so few industries is the lack of skilled workers. It is very difficult for a boy outside of a trade school to learn a trade.

A boy usually begins work by running errands in the shop, until some



DUTCH WORKINGMEN IN SUNDAY DRESS

labor are long. The children leave their beds frequently at five or six in the morning or earlier, summer and winter, gulp down some hot coffee or what is commonly called so, swallow a huge piece of well-known Dutch rye

*Mr. William H. Dooley is secretary of the Massachusetts Industrial School Commission and principal of Lawrence Industrial School, the first of its kind to be established by the State of Massachusetts. He has had wide experience in educating youth for industrial pursuits and recently spent several months studying industrial and technical education in H lland, Pelgium, Germany, Austria, Switzerland, France, England, and Ireland. Mr. Dooley will, each month, give readers of The American Blacksmith a paper on his observations in trade and educational circles abroad.

one above him or some workman accidentally leaves the shop in which case he is moved up and a new boy has the errands to do. He must look out for himself now. His master is not over anxious to let him learn all the ins and outs of the work, for he is afraid that his competitor might hear that he has a bright boy in the shop and that boy is likely to be tempted away by the offer of better pay.

The workmen are very secretive and are not inclined to impart any knowledge. They will say, "Why should I?

Nobody did for me." Then again the proprietor does not like the workmen to waste their time in teaching the boy. The boy is regarded as a nuisance.

In the plenty of first-class workshops in Holland where no apprentices have been admitted for dozens of years because the employers do not see their way clear to make an agreement with the boys or parents which would prevent them from letting a competitor enjoy the results of their technical instruction.

During the last few years the nation has seen the great results accomplished by neighboring nations as a result of a complete system of technical and industrial schools and has begun to ask whether technical education ought not to be taken up by the State. The Dutch like private enterprise in everything and they are inclined to prefer it to State or Municipal action. This is an example of how the Dutch are grasping new ideas. As a result the State has come to realize that technical schools ought to be under State control.

In Amsterdam there is a metalworkers' school, with excellent courses in woodwork, forging and ornamental iron work and machine shop practice.



A WORKMAN OF HOLLAND AT HOME

The pupils enter at about fourteen years of age and remain in the school two years, each pupil taking all the courses. One half of the time is devoted to shopwork, the other half to the theory of the various branches taught in the shops and drawings.

The school is very thorough; all practice work is done on objects of normal size and for actual use. Real windows and doors are made. Within the last few years an extension costing twenty-five thousand has been built on one of the schools and every stroke of the work for the interior building—sash and door working, stair building, painting, plumbing, etc., has been done by the pupils. Similar schools are located in all the large cities of Holland.

This school, like all others in Holland, owed its origin to a private society. The State and City supports the schools since the government has taken an interest in them. The graduates meet with great success and have no difficulty in obtaining steady work.

Since Holland is a great commercial country one would naturally expect schools to meet the educational needs in this line of work. There is in Amsterdam one school devoted to the work of educating engineers exclusively for sea duty. This was established in 1878 by progressive ship owners to insure proper training for engineers. Since this school has been established there has been less damage due to incompetent engineers.

Kindred in aim to the training school for marine engineers is the old school renowned in the Netherlands and known as the Training School for Merchant Marine. The aim of this school is to train officers for the Dutch Marine. Not all boys with inclination for sea duty are able to avail themselves of the expensive training supplied by the marine service school. For such as are unable a cheaper course is provided in the nautical school.

There are two commercial high schools called (Handelschule) one at Amsterdam and the other at Rotterdam. These schools aim to prepare the boy for commercial activities. The course is five years. The first three years is a preparatory department for the last two years. In addition to the ordinary common branches the following subjects are taught: Four modern languages, and stenography in those languages, typewriting, commercial arithmetic and algebra, applied geometry, industrial chemistry and technology, industrial physics, commercial law and commercial farm and correspondence. These commercial schools differ from our commercial and business colleges in America in that their course in bookkeeping, stenography, typewriting, etc., cannot be taken alone. There must be added

for nearly or quite one-half the course technical instructions and business processes, including such subjects as production, market, distribution, consumption of the product, price fluctuations, relation of exports and imports, etc. The object of all this is to develop commercial intelligence rather than create mere bookkeepers, etc.



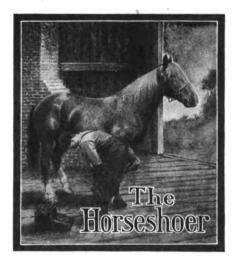
A DUTCH BOY AT PLAY

There is a trade school in Enschede, the center of the cotton industry, that prepares and trains workers for all kinds of mill and metal work.

A number of dairy schools are scattered through the country to teach the practical principles of agriculture and dairy work. Thus, Holland is making great progress along the line of trade education. In addition to the institutions for classical learning, there are separate secondary schools teaching the boy between fourteen and seventeen commercial and industrial branches. Trade schools for teaching wood and metal work with day and evening sessions for industrial workers are quite common.

In Holland the true education is always kept in mind as the main object to be accomplished and the practical work is given as systematically as this can be arranged. In other words, every school in Holland has a specific aim. The manual training which has many supporters in this country is virtually unknown in Holland, due to the fact that manual training aims to impart a general manual facility,

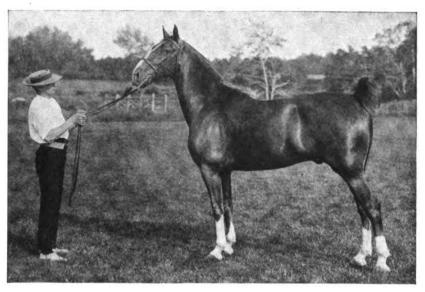
without direct reference to any vocation the same as general mathematics differs from applied mathematics. The schools in America might derive a great deal of value by studying the methods of instruction and courses of study in these schools. It seems as if all our American industrial and technical schools are bent on one aimto prepare for experts and superintendents. The present American educators do not realize that education for the adult workers to meet his daily needs is coming to be as important as the education of the child. The average length of a boy's school life until recent years was only about four years and that was before he was twelve years of age. Consequently these boys who are now the workers have received little if any more education than that obtained during these four years. The average American workman has not received any more general education than his Dutch brother who left school at the same age. But the Dutch workman has unlimited opportunities to attend evening or day schools and his employer makes a special effort to allow him time to attend these schools. Consequently there is accordingly a large demand for educational opportunities not afforded by our existing public schools—a demand made by those deficient in early education who are desirous of making up this deficiency and to increase earning powers. (To be continued.)



Curing Forging and Clicking.
w. H. CHAMBERS.

For forging I trim more off the toe of the front feet than I do off the heel and do not make the shoe too long, yet it can project back one eighth to one fourth of an inch past the foot. If plates are desired I roll the toe a little. If I put heels on there is sel-

dom any use of rolling the toe. Now, the hind feet—if the hoof is dubbed off at the toe I let the shoe project out in front until it is in line with the slant of the foot or where the hoof one-half ounce; turpentine, two ounces; mutton tallow, two pounds; oil of organum, one-half ounce; tincture of iodine, one-half ounce. Mix all well over a hot fire. This is one of the best



A PURE-BLOODED HACKNEY-WINNER OF MANY PRIZES

ought to be and make the shoe good and long, what I call a comfortable fit. This will increase the action in front and also decrease it behind. All horses that are high rumped are apt to forge. I have seen horseshoers set the hind shoe back and dub the toe off and cut the front shoes' heels off till they would be one half inch under the heel of the foot and then wonder what in the world made that horse overreach.

Seedy Toe and Wall Separation at the Toe. ANDREW M'LAIN.

Brother W. W. Abney, of Alabama, wants information on shoeing a mule that has a parted wall at the toe. Now, I would say for him to shoe that mule with a four-calk bar shoe or in other words, an open-toed bar. Weld a calk on each side of the toe, fit shoe so as not to have any bearing on the toes. When you have shoe fitted to shape of foot, bend the toe of shoe next the ground surface so as to leave a good space between shoe and the toe of foot. I would suggest to cut as much of the separated wall away as possible. Cut it as far up as it is loose for it will never granulate again. You must grow a new hoof in all cases of separation of the hoof.

I would also advise the brother to pack well with bees' wax and pine tar. He can also use the following preparation on the foot: Verdigris medicines that can be made for scratches, hoof evil or cuts and it is good to apply on fistulas after the swells are taken out. I have made a specialty of seedy toe; separation at the toe, quarter cracks, corns and thrush. This ointment never fails. I have seen it used in the British, French and German armies.

The Blacksmith Boy Who Went to Congress.

When a boy is working in the shop of a blacksmith at fourteen years of age, and has never read a book through before the age of eighteen, and then rises to the position of chairman of Uncle Sam's committee on appropriations, it is convincing proof of the fact that there was some good stuff in that boy, and that he had a sort of "never-say-fail" spirit. The Honorable James A. Tawney was that kind of a boy. At the age of fourteen James Tawney bundled up his school books and left school because his father was so poor he could not afford to keep the boy in school any longer. The father was a blacksmith, and his apprentice had left him. It was not easy to secure another apprentice, and so the boy James bade good-bye to some high aspirations of going to college he had cherished in secret and went into the grimy blacksmith shop. Speaking of his work as a young blacksmith, Mr. Tawney has said:

"I learned the blacksmith trade

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thoroughly, spending four years with my father, and then following my brother to Dubois, a lumber center in Clearfield County. My brother was but I had no time for such entertainment. Had I spent my time dancing I am satisfied now that I should never have become a lawyer."



THE GENERAL SHOP OF MR. C. E. ARCHER, IN ILLINOIS

a superintendent in the largest sawmill in the world, and got me a place in the blacksmith shop of old John Dubois. Old John came in one day while Charlie Sapp, my boss, was sitting on the forge with his face in his hands, and while I was pounding a piece of Swedish iron with all my might. About two minutes later I had Charles Sapp's job and his wages. I made things in iron for John Dubois. who invented canthooks and other contrivances used in connection with lumber and logs. He sent me to his machine shop, where I learned to be a machinist on the full pay of a journeyman blacksmith. So I had two trades."

Mr. Tawney says that up to the time he became a machinist he had never read a book through from cover to cover, and yet he had taken part in the debates in the old country schoolhouse in which he had gone to school. The first book he ever read was a "Life of Washington," and it made a strong impression on him and made him feel that a young fellow with but a limited education might get on in the world and take his place with men who had the best of educational advantages.

Having had the fire of ambition lighted in him, the youthful machinist set about perfecting his education. He had an uncle, a minister and a man of education, who was interested in his ambitious and industrious nephew, and Mr. Tawney says:

"I wrote long letters to my preacher uncle in Indiana, that he might correct my grammar and spelling and return them for instruction. My young friends wanted me to take lessons in dancing, Young Tawney had by this time decided to study law, although he was without the money needed to go to a law school. He went into a law office

and did all sorts of work to earn his living while he, at the same time, studied law. At the end of eighteen months of about as hard work as it would have been possible for any young fellow to have done, the aspiring young lawyer was cheered by having a judge of a good deal of prominence tell him that he would one day "make his mark" as a lawyer,—a prophecy that came true. He was admitted to the bar when he was twenty-seven years old, and in time the boy, who was working in a blacksmith shop at fourteen years of age, found himself in Congress. Now he is chairman of a committee having in charge appropriations aggregating millions of dollars each month.

Thus did the smithing craft become a solid foundation for future success. From Jim Tawney, blacksmith boy, to the Honorable James A. Tawney, Chairman of the Committee on Appropriations, is a long stride—but it is a story that should be an inspiration to every young man to do his best always.



When a speed-indicating meter is to be attached to a car, care should be exercised to have the gears, which are attached to the road wheels of the car, exactly centered. Otherwise the gears will wear quickly and will also be noisy. Motorist, New York.

When storing a car for the winter, drain every drop of water from radiator, cylinder, pumps and all parts. This can be done by disconnecting the bose between the radiator and the pump; open the pet cock under radiator; take out the small plugs in the lower part of the cylinders; keep oil in crank case and jack car up to relieve pressure on tires. Bare metal and polished parts may be cleaned and then rubbed with vaseline to prevent sweating and rusting.

B. E. M., Pennsylvania.

Some Practical Repair Hints for the Automobile Repairman.

H. F. TAYLOR.

While the automobile repairman is not likely to be called upon to repair a cracked cylinder for some weeks, it

may be well to mention several methods that are suitable for repairing this very annoying trouble. If the cylinder has cracked on the outside only, the repair becomes a practical simple matter. But should the crack extend to the interior wall, little can be done except to fit a new cylinder. In this case, if the car is of the multiple cylinder type, the damaged cylinder should be disengaged by disconnecting the piston rod from the crank shaft and pushing the piston up into the cylinder until the piston ring expands into the combustion chamber and thus holds the piston up and out of the way. The car may then proceed on the other cylinders.

If the crack is on the outside wall of the water-jacket fill the crack with a mixture of iron filings and salammoniac. This is done much in the

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manner in which boatmen calk the seams of a boat, i. e., take a chisel of suitable size and drive the filings into the crack, being careful not to drive so hard as to extend the crack. The filings and sal-ammoniac will rust in the crack and thus close it effectively.

Should the crack be a large one it may not succumb to the above treatment. It may then be necessary to place a patch over the crack in the following manner: Drill a hole at each end of the crack to prevent it spreading further and fit stub screws into these holes. Now cut a plate L to fit over the crack with a liberal edge as shown in the engraving. Drill holes through the plate as shown, to correspond to screw holes in the cylinder. Now spread several thicknesses (if thin) of packing over the crack and fasten the plate in place, screwing it down well and placing plenty of pressure on the packing. The edges of the packing P may then be trimmed flush with the plate.

A broken suspension spring, while usually a simple thing to repair temporarily, is very annoying to the automobilist. One very neatly repaired some time ago was as follows: The spring leaves were broken as at B, Fig. 2. To enable the motorist to run his car until the arrival of a spring, a piece of straight-grained timber was trimmed down as shown at A, Fig. 2. This was fitted over the broken spring and fastened with clips as shown. Of course, a repair of this kind does not allow the motorist to do any speeding, but it will enable him to run his car

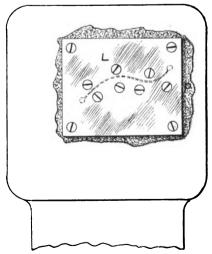


FIG. 1-REPAIRING A CRACKED CYLINDER

home or until a new spring can be procured.

It sometimes happens that a key holding some part of the transmission gearing will shear off or work loose in its slot. When the key has worn loose in its slot and the slot has become enlarged, make a key as shown at A, Fig. 3, with a large base. Fit this in to the enlarged slot while the smaller head will fit into the corresponding key way in the gear wheel. Should the key slot be so badly worn as to make the above impractical, the slot may be brazed up and a new key way made.

Adjusting, Repairing and Caring for the Automobile—10.

Lubrication.

Makers of high-priced foreign cars still consider the simplest form of hand pump sufficient for all purposes, and so when an American buys a foreign made car, paying as many thousands as we ask hundreds for the same power, he is willing to use the hand pump and to replenish his oil supply whenever necessary. The American craze for automatic

and with oil enough at the start to cover the bottom of the case three eighths of an inch deep, it may all be threshed out in five minutes by driving full speed or by letting the engine

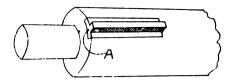


FIG. 3-A REPAIRED KBY

race that long. A driver who understands and appreciates this will have no engine-bearing troubles.

Not knowing the individual characteristics of each driver it is impossible to say just how many drops of oil should feed to the engine base, but 30 or 40 drops per minute when engine is running at moderate speed is about right. One or two a minute for front bearing and universal joint will be ample. It is

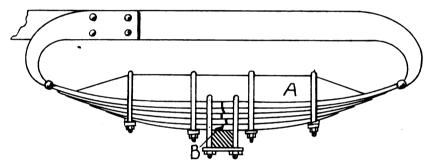


FIG. 2-A TEMPORARY REPAIR UNTIL A NEW SPRING IS PROCURED

devices, however, demands that every function of the machine be performed without any attention on the part of the driver, and so we have a plethora of automatic oiling devices, mechanical and otherwise. There is a difference of opinion as to the accuracy and certainty of these devices. For the man who will take the trouble to thoroughly understand his oiler and to carefully adjust it to the engine's needs—and these needs are determined entirely by the peculiar methods of each individual driver.

It is a crime to race a motor. It is little less a crime to drive a car at its highest speed for any considerable distance—especially when it has much reserve power and speed.

When the engine is driven to its limit the oil is not consumed, but is thrashed into a spray—a vapor—by the rapidly revolving cranks, and the excessive pressure set up in the base soon forces it out of the case. Most cases of worn engine bearings is due to this cause. While a car may be driven all day, covering a distance of say 150 miles or over on one filling of the tank

best to remove the side plates frequently and examine the oil level until you have ascertained how much feed is necessary to maintain a uniform level in the crank case, and if the oiler is not sufficient to maintain this put about a half pint in at the breather tube every other morning. Inasmuch as dirt and carbon collects in the base in very fine particles and will eventually get into the bearings the oil should be drained out of the engine every two or three weeks and a fresh supply put in. It is well to mop out the base by removing the side plates, using waste saturated with kerosene to cut the oil away.

One owner, who claims he has driven 15,000 miles and who asserts his engine is better today than when he first received it from the factory, makes it a practice to pour two gallons of kerosene through his engine every two weeks. He removes the plugs over the valves and, pouring a small quantity in each cylinder, works it down past the pistons by cranking the engine over by hand. When told that it was not necessary to use so much he replied that two gallons of

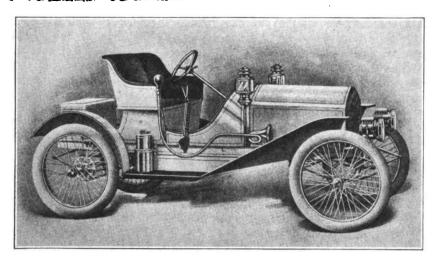


FIG. 1—THE METZ CAR COMPLETE WITH FITTINGS

kerosene was cheaper than any other way he knew of to keep the engine in perfect condition, and while he might use a quart with satisfactory results, he felt safer in using plenty. A ride in his car and the hill-climbing demonstrations with it proved the correctness of his theory. The kerosene removes carbon from piston heads—unless it has been left long enough to become caked hard—cleans out the grooves, frees piston rings, cleans valves and finally rinses out the bearings in the crank case.

In regulating the force feed lubricator it will be noticed that the entire mechanism is submerged in oil. One pump is used for each outlet, the stroke of each pump being regulated by the rising or lowering of the adjusting wedge, which is accomplished by turning the adjusting button to the right or to the left.

No. 1—Fill reservoir to within three quarters of an inch of top.

No. 2.—Lubricators are shipped regulated to feed the maximum amount and when first started should be run at full capacity until oil shows at points of lubrication.

No. 3.—To regulate the flow of oil, start the engine at normal speed and regulate the proper amount of oil for each point of lubrication by turning adjusting stem to the right for more oil and to the left for less. This operation should be repeated for each feed. The amount of oil being pumped from each outlet will be shown at bleeder test stem when push button is depressed. When being tested, the supply of oil is forced through the bleeder cock instead of the bearings. The push buttons should be released when test is completed.

Too much importance cannot be placed on the caution to strain all lubricating oil through several thicknesses of clean cheese cloth before putting the oil in the lubricator. Dirty oil will cause trouble, and a few minutes spent in straining the oil may save time, trouble and expense.

(To be continued.)

The Metz Car and the Plan of Selling it.

The engraving, Fig. 1, shows the complete Metz car. It is described as a ten-horsepower runabout. The motor is of the two-cylinder opposed type. The transmission is by means of a composition plate on to a fiber sliding ring making possible any speed forward or reverse within the range of the motor. The final drive is from counter through \(\frac{3}{4}\)-inch roller chains to rear wheels. The frame is of pressed steel section for the sides and tubular cross members. The wheels are quick removable at hub, with wire tangent

be gained of the transmission and also the motor suspension.

The plan of selling this car is unique, and will, no doubt, be of interest to our readers. The car is, of course, made entirely at the factory, but instead of sending the entire car at one time and assembled, the various parts are sent in groups and the purchaser assembles his own car. For instance, one group consists of the frame reaches, the cross members. radiator frame, necessary bolts and nuts and all tools. The next group includes the springs and axles. And so on until the lamps, horn, starting handle, etc., are received. There are fourteen groups in all.

Some Rubber-Tire Hints for the Repairman.

C. B. STANTON.

While the wear and tear of automobile tires concern the car owner and driver more especially, it is well for the repairman to know something about the keeping of tires and the lengthening of their life and usefulness.

The brakes of a car are the cause of more wear on the tires than any other one thing. It is important that brakes work correctly, evenly and easily. Jamming the brakes on hard not only injures the tires, but injures the car as well. Some auto-drivers start and stop their cars as a motorman does his trolley-car. The sudden stopping of the street-car tends to put flats on the wheels. Sudden jamming of the brakes on an automobile and consequent sliding of locked wheels

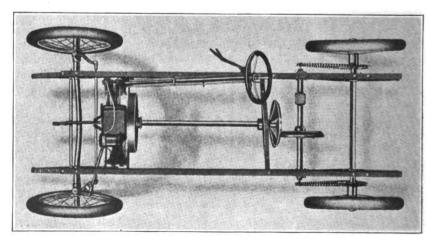


FIG. 2.—TOP VIEW OF THE METZ CAR CHASSIS

spoke and steel rims. The wheel base is eighty-one inches with a tread of forty-eight inches.

In Fig. 2 is shown the chassis of the Metz car. Here a good idea can

along the road or pavement destroys the tires.

Rounding corners at high speed is not alone dangerous, but plays havoc with the tires. It places a strain on

the tires that they can stand but a comparatively short time.

It is important that all wheels on the car run true. It can be readily seen that much wear will result if a wheel runs "wobbly" or out of alignment.

The "curb" seems to be another cause of wear and strain on rubber tires. An automobile should never be run in close to the curb. How often do we find cars standing along the curb with their wheels practically jammed right up against the stone. And it's bad for the wheel as well.

It is absolutely necessary, to the long life of the tire, that it fit the rim correctly. If it does not the tire will "blow out" frequently and the inner tube will puncture easily.

All tires are made to stand a certain weight, according to their size and quality. If the machine is overloaded it will affect the tires. They will not stand up under a heavier load than they are built to stand.

Grease and oil affect tires badly. And this is something that the repairman should paste in his hat. Never allow a car to stand for any time on an oily, greasy floor. Keep the shop floor, where the cars are run in, as clean as possible. If oil does get on the tires wipe it off with a rag dampened with gasoline. The latter will dissolve the oil and grease and evaporates quickly.

Extremes of heat and cold also affect tires badly. In storing tires it is well to keep them in a dark, dry, cool (not cold) place where the temperature is as uniform as possible.

A car should always be started straight forward or backward. The steering wheel should not be turned until the car is well started.

When a tire is worn through the casing it should be recovered at once. If done promptly it will save considerable expense. The repairman will do well to point this out to the owner when a car comes in with badiy worn tires.

The repairman should also keep his eyes open for cuts and gashes in tires. A cut vulcanized in time will save an otherwise perfectly good tire. If a cut is small clean it thoroughly and flush with gasoline. Allow to dry and then fill with rubber cement and allow to set.

A good table to follow in inflating tires is as follows: $2\frac{1}{2}$ -inch, 50 pounds; 3-inch, 60 pounds; $3\frac{1}{2}$ -inch, 70 pounds; 4-inch, 80 pounds; $4\frac{1}{2}$ and 5-inch, 90

pounds. Imperfect inflation is responsible for many tire troubles. Tires should be inflated so that no perceptible indention is noticed when the car is empty.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants to do nickelplating. I would like to have someone tell me how to nickelplate iron hand rails for a gig.

D. TEMPLETON, New Zealand.

Wants Plow Information.—I would like
hear from some brother smith as to the

to hear from some brother smith as to the best way to point an old plow lay.

Frank H. Peckham, Iowa.

Wants to Solder Iron.—I would like to hear through "Our Journal" about how to solder iron. Can some brother give me information on the subject?

G. B. Hodges, Mississippi.

Want to Build Wagon-Jacks. Will you please give through your columns illustrations of self-made jacks for lifting axles, so as to get the wheels off easily.

CHAS. L. GEORGE, Wyoming.

Wants a Hoof Remedy.—Will some brother craftsman give me a sure remedy that will toughen and grow a good hoof on a bad foot. I have a fine horse, but he has bad feet. I have used several remedies, but the hoof is still poor.

E. W. PATISHALL, Georgia.

Several Requests.—Will you please write in your magazine or tell some good brother to give me some good information on how to build horse stocks for shoeing wild horses and mules. I know some good smith has a plan that will be better than buying one, and cheaper. Also print in the great book something about gun work and brazing and tempering springs.

J. L. DECKARD.

Shod a Mule Three Weeks Old. I have the pleasure of sending you an item which will be new and which I don't suppose was known in the history of the world. Several weeks ago I shod a little mule that was just three weeks old. He had crooked feet and I put shoes on him and straightened his feet. He is all O. K. now and you can't buy him for \$75. The man said before I shod him he would have taken \$1.00 for him.

W. H. SMITH, Tennessee.
To Fasten that Churn.—Mr. H. A. Henke
is asking some brother how to fasten churn

run by power. He wishes to hear this from some brother through the journal. I would tell him to simply drill the holes with a stone drill or cold chisel and then take some big lag screws; put them through the leg of the churn, into the holes in the concrete, and then fill the holes with lead or hard solder. This will hold the churn down.

C. N. DEHLINGER, Wisconsin.

From Minnesota.—I like THE AMERICAN BLACKSMITH very much and would not be without it for a good deal. I don't see how a blacksmith can get along without it. I must say that THE AMERICAN BLACKSMITH is a good paper. It is the best one which I have, and I have different ones which I like, but THE AMERICAN BLACKSMITH is mine own. I read every one of my papers through, because it does me good and helps me along. It gives lots of good ideas and remedies for different things and different ways of doing things. I am a young blacksmith, only twenty-four years old. I do all kinds of blacksmith work and wagon-making-practically everything in the blacksmith line. I want THE AMERI-CAN BLACKSMITH while I am blacksmith-JOHN SCHAFFER, Minnesota.

Improving "Our Journal."—As to improving the journal, I don't see how we are to go about it. I took the American Thresherman one year. It has a sermon each month -from one to two columns and also a children's page, which was interesting. I don't suppose that very many of us cobblers are preachers, but most any of us could stand a little of the Truth once a month. I know some blacksmiths who are mighty fine men and judging from their letters in "Our Journal," none of them are below the reasonable and respectable line. So why not-if possible-arrange for a sermon in each issue? Some brother blacksmith might read the Truth there when he would not think of it otherwise. It will harm no one and possibly do much good, even to the saving of some soul.

W. H. CHAMBERS, Washington.

From Minnesota.—I am doing well, am never out of work and never make new work of any kind. I am putting in a cold tire setter, the first one in the county. It is not a question of how to get work enough, but how to get all the work done. My machinery consists of a six H. P. International Engine, eight-inch feed mill, a Hawk Eye Hammer, a Western Chief Power Blower, two forges, one shear, one emery stand, one power and hand drill, and one Wonder Disk Sharpener. Prices we make to suit ourselves. Sharpening plow shares, 75c.; pointing, \$1.25; sharpening corn shovels, per set, \$1.50. Horseshoeing has been 20c. and 40c. From now on I am going to charge 25c. and 50c. and keep the price there, no matter what others charge. I do not believe in organizations.

Andrew Peters, Minnesota.

A Letter from Ohio.—I find many good pointers in the paper. Our prices here are too low, but better than they were four years ago. I wish all smiths in the whole United States were organized. We get \$1.20 for a set of new shoes and \$.60 per set for removes. I have all the work I can do, but prices are too low. I have a farm of ten acres for a side line and keep two cows and a horse. I love to get out in the fresh air once in a while. I have a wife and

six children and they have never starved yet, if some of our brothers do think the old trade is no good. My shop is 20 by 24, and I am building an addition 14 by 20, so I can repair buggies and wagons. I would like to see more talk about horseshoeing as I do a great deal of shoeing. If any brother has any questions to ask about shoeing I will be glad to answer them.

D. H. REGAL, Ohio.

On Contracted Feet.-I wish to give W. E. Eatman, of Alabama, my way of spreading horses' feet. I take an ordinary front shoe, turn a common square calk, leaving them stand out well at bottom, then hammer on outer edge from quarter to heel to make a good bevel outward. Then fit close, making shoe good and long. The foot will be compelled to grow out over the bevel on shoe. I have been shoeing a mare that had contracted feet of long standing, and the last five or six times I have shod her I have been able to gain one eighth inch at each shoeing. She was very lame and sensitive, but now I can clinch as hard as I please. I shoe her every three to five weeks. So many people won't give the shoer a chance to shoe often enough. This is the second one on which I have had a fair chance, and it has worked on both. I don't do anything but shoe horses.

Z. D. Robison, West Virginia.

A Letter from York State.—I consider the paper a valuable one to any good mechanic, but find some would-be blacksmith telling how cheap they work and how fast they can shoe horses. I don't believe in working too fast; too much fast work on a horse is bad practice. I don't believe that any horse that is shod in less than one hour is more than had his shoes thrown at him. I don't care how good the man is that taught himself his trade. I served seven years as an apprentice and don't believe anyone ever could learn the trade without serving his time with some good smith and, therefore, he should not be considered any more than a botch. There is some very valuable reading in this magazine. The June issue had a splendid lot of shoes; the man that wrote that and made those shoes is a horseshoer and a good one, too. The cuts of his shoes were worth the price of your magazine that month.

Andrew H. Reckner, New York.

After the Fire.—I had a fire on Tuesday night that destroyed my entire shop and contents; consequently, I have a good many twist bits, drill bits and large amount of mower and reaper sections and guardplates which are useless in their present condition. I wish to ask you or some of your readers through your paper to tell me of a way that is quick enough to be profitable to temper these various things so they can be used, also to smooth them, as you know everything is rough that goes through a fire. Also, is it profitable to have rasps and files tempered, and where is such work done? What firm dresses and tempers anvils? I have two good anvils, but they have been red-hot and are of no account without dressing and tempering. I don't ask to give an answer on these questions at once, but in the near future, as I see in your paper that you ask for answers that would be of benefit to the reader, and these are surely of importance to me.

HENRY C. HEITHECKER, Indiana.

Can Turn a Shoe in one Heat.—A German horseshoer, of New York City, says he has done a stunt. He can make a shoe complete in two heats, and a former jockey has \$500 that says he can do it. I believe he can do it very easily in two heats, for I have turned a shoe with toes, calks, and clips complete in one heat. Now don't misunderstand me. I take the two straight pieces of iron, one for the toe calk and one for the shoe, and in one heat fit it to the foot clips and all complete. I turn a bar shoe complete in one heat. How is that for an Irishman who has one injured hand, caused by a vicious horse. I would like to hear of some young brothers who are able to do a stunt like that. We need some brothers to do stunts to revive the craft. I do believe there ought to be contests in every town in this country on turning horseshoes to encourage men and boys in the business. It is one of the expert trades on earth, if done correctly and fast.

Andrew McLain, Pennsylvania.

A Letter from Arkansas.-I am located in a small railroad town in Arkansas. I have a shop 48 by 60 and my power is a six-horsepower Weber Gasoline Engine. 1 have an 18-inch jointer, a 16-inch rip saw, a 20-inch cut-off saw, a tenoning machine, a cold tire setter, a turning lathe, and a grind stone and emery grinder, a 20-inch band saw and a rotary force pump, all run by power. My pump furnishes water supply for myself and others. My water intake is 40 feet high. I have 2 blowers and other tools in proportion. I do lots of repairing, mostly farm work. At odd times I build wagons. As a side-line I run my waterworks and a picnic swing, which pays me well. I have two swings and the two made \$164.40 for me on the third of July. If some of the brothers living in the country where there is no swing would build a swing they would find it would pay them well and they can run it in connection with your shop all right, as everybody goes to the picnic. And you can get away with the swing. If any brother wants to build a swing and doesn't know the plans, I will send a blan free of charge to anyone asking me.

W. B. HOLBROOK, Arkansas.

A Letter from Australia.—I am pleased with "Our Journal" and spend many a pleasant hour in perusing its contents.

I might mention that a lot of the information given is intended with the best of purpose, but quite unnecessary, such as all these new-fangled shoes. I have a shoeing smith who has been shoeing in this shop thirty-four years and twenty-three of those in my employ and out of that time has never used any other than the plain shoe, stamped (not fullered), and has none of the horses cutting during the whole of that time. We have our share of difficulty as well as others, so there must be something in knowing how to put on ordinary shoes on a horse.

The smithing trade in this colony has reached a very high state of perfection and is varied, but still we are not too old to learn and find a great many good hints in "Our Journal." While writing I might mention that it is understood that the first break made and used was made about four miles from here on a Sunday, by a Mr. Godley in a shop at a place then called South Petherton, now called Tungkillo. I should like to find out if that is correct and

would be well worth controversy.

A. W. LOVEDAY, South Australia.

Shoeing and Vicious Horses.-- I am very much pleased with THE AMERICAN BLACKsmith and can assure you I find it very instructive, though quite amusing at times. I read where someone, who either has only a year or so of experience, or has read up a little on blacksmithing out of books, wants to start up in business for himself. The farmer and horseman should take a man of that kind out of the shop and tramp on him, as he is the kind of a man that usually cuts prices and knocks the business by deficient workmanship. Let him serve time with good men and become efficient in his trade before presuming to work an injustice upon the unsuspecting public and unfortunate horses that may happen to be brought to him. Regarding the article by E. Z. Mark in the June number, I must say you are what we call in Montana a "live one." You have the only system of handling a bad, vicious horse, and if any of those fellows think they can handle a half-broken broncho with salt or sugar they are totally ignorant of western horses. I can be kind and gentle with any horse, but when I get one that kicks, strikes and comes at me with his ears back and his mouth open, I hike for the rope and hog-tie him. I can easily handle him then. My advice is, never take a chance on a bad one, as doctors' bills come high.

Chas. J. Jones, Montana.

A Word from Australia.—I notice in the April number you have an article on the Toledo blade. I think it doubtful whether our modern scientists can find out the secret. I don't know much about steel, but I think the secret lies in an element which the modern scientist does not keep in stock, i. c., elbow grease. The ancients were not so anxious to make money as to make good swords. It is said the Chinese make good razors out of old horseshoes, the pounding on hard roads toughening the metal. By such pounding on the anvil the ancient blacksmith would toughen his steel perhaps for a penny a day.

I also see in the April issue a discussion from a correspondent in Georgia, which I think a very sensible article, called a talk on buying. I have often wondered why such thoughtful, sensible men as are many of the smiths in the United States permitted themselves to be charged such excessive prices for things they require when they live in the country in which those things are manufactured. Why should they consent to pay, not only the value of the article when manufactured, but also a large profit to the middleman. And then complain of their prices being low, talk of uniting to raise prices of their work, while they permit men who do nothing whatever to produce the goods they buy, to fatten on their labor and consider them a necessity. As well might the farmer and orchardist consider the grubs, lice and other pests that fatten on their labors a necessity, and ask higher prices on their produce. My advice is deal only with the manufacturer who is not afraid to publish his prices to the world. JAMES DIXON, Queensland.

Wages and Trade in South Africa.—I had no idea that wages ruled so high your way. Here, a floorman gets at the present time 25 shillings (\$6.09) to 40 shillings (\$9.74)

per week, and a fireman 36 (\$8.76) to 40 (\$9.74) shillings per week—that is, of course, in the horseshoeing business. The grand old trade is not on the same footing here as it is up your way. There are just as good shoers here, I quite believe, but the way they cut prices in this part is cruel. You must understand that the class of customers we have here desire one shoe fitted on at a time, and he'll go anywhere to get an iron in the horse's hoof. It does not matter to him whether it is a shoe that is finished or whether it is fitted to the foot. All he thinks of is the cheapness, and he cannot see for the life of him that that is only surface cheapness. Even the gentry get in the habit of having two shoes put on at a time. In case you might think that I mean the good shoer here cuts the price it is not so. What I meant to say was that there are just as good shoers here as there are your way, some of them colored, too, but the man who cuts the price is the jobber or one who has a fancy for the trade and never learned it. Many of them have only seen a horseshoe a few times, one might say, and I am also sorry to say that a few of the better class shoers are stooping to shoe a horse anyhow to keep up with the jobbers. But "your humble servant" is not one of them; have never shod under a shilling. I remove for nine pence, but no new shoeing for less than one shilling per foot. Your journal also to hand this mail and though there are many articles that do not concern me for the moment they can be laid up in the brains for the future. Kindest regards to all who read the journal and my best wishes to you, dear Editor.

L. G. REID, Cape Colony.

Price List Adopted by United Blacksmiths and Wheelwrights of Arkansas. WAGON-WORK.

WAGON-W	OILIL.		
	Wood-	·Black-	
	work.		Total.
A-las from	\$3.50	\$	_
Axles, front		•	\$
Axles, hind	3.00		
Tongue	2.00	. 50	2.50
Tongue hounds, per pair	1.50	. 50	2.00
Bent or front hounds	2.25	1.25	3.50
Hind hounds	1.50	1.00	2.50
Doubletree	.50	.50	1.00
	.50	.10	.60
Singletree		.10	
Neck-yoke	. 75	. 25	1.00
Bolster, old iron	1.00	. 75	1.75
Bolster, new iron, hind	1.00	1.25	2.25
Bolster, new iron, front	1.00	1.50	2.50
Coupling pole	. 75	.25	1.00
Standard	.15	.15	.30
Brake beam	1.00	.50	1.50
Drake Deam.	.20	. 50	1.00
Spokes, each	.20		
Felloes, each	.25		
Filling full front wheel	3.75	. 75	4.50
Filling full hind wheel	4.25	. 75	5.00
Rimming front wheel	1.50	. 75	2.25
Rimming hind wheel	1.75	.75	2.50
Wagon bed, rough	7.00	3.00	10.00
Wagon bed, rough			
Wagon bed, dressed	12.00	3.00	15.00
Wagon bed, bottom rough.	2.50		
Wagon bed, bottom dressed	3.00		
Spring seat, with lazy-back	2.00	2.00	4.00
Feed box	1.00	.30	1.30
Setting skein and boxes on			
old axle	3.00		
Setting tire (single)	0.00	. 75	
		2.00	
Setting tire, full set			
Making new tire, 1 1x 1		4.00	
Making new tire, 1 x		4.25	
(All other tires in proportion)		
BUGGY-W			
			1
Axle caps	\$ 1.00	\$.50	\$ 1.50
Peles, buggy	2.50	.50	3.00
Poles, hack	3.00	. 50	3.50
Poles, circle	.50	.50	1.00
Wheels filled	4.25	.75	5.00
	1.25	. 70	0.00
Wheels rimmed			1 00
Reach,	. 50	.50	1.00
Shafts, new iron	2.50	2.50	5.00
Shafts, old iron	2.50	. 50	3.00
Shafts crossbar	.50	. 50	1.00
Singletree	.50	extra	
Doubletree	.50	.50	1.00
	7.00	extra	00
Bed piano		CALLE	
Bed drummer	9.00		
Bed hack 2-seat, plain	10.00		
Bed hack 2-seat half panel.	12.00		

Bed hack 2-seat panel	\$15.00		
Bed hack 3-seat plain	12.00		
Bed hack 3-seat half panel.	15.00	extra	
Bed hack 3-seat panel	18.00	extra	
Welding axle 1 in. to 11 in.	• 00		AE 00
and setting box	1.00	\$4.00	\$5.00
Welding axle 1 in. to 1 in.	1.00	4.50	5.50
and setting box Welding axle 1 in. to 1 in.	1.00	4.00	8.80
and setting box	1.00	5.00	6.00
Setting tire (single)		.75	
Setting tire, full set		3.00	
Making new tire		4.00	
Setting axle, light		1.00	
Setting axle, heavy		1.25	
PLOW W	ORK.		
Plow beam, pony	\$1.25	\$	
Plow beam, two-horse	1.50		
Plow beam, two-horse heavy	1.75		
Plow beam, Georgia stock	.50		
Plow handles, per pair, pony	. 50		
Plow handles, per pair,	. 65		
two-horse	.00		
hosyv	.75		
Plow points pointing, pony.		.35	
Plow points pointing, two-		.00	
horse		.50	
horsePlow points pointing, extra			
large		. 75	
Plow sharpening, calf tongue	•	. 05	
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Plow sharpening, double		10	
shovel		.10	
Plow sharpening, sweeps up to 14 inch		.10	
Plow sharpening, sweeps		.10	
over 14 inch		.15	
Plow sharpening, sweeps			
over 18 inch		. 20	
Plow sharpening, all others			
in proportion			
Plow sharpening, one-horse		.10	
Plow sharpening, two-horse. Plow sharpening, two-horse		.12	
heavy		.15	
Sharpening harrow teeth,			
each		.02	
each	5.00	•	
HORSESHO	DEING		
Plain, No. 1, 2, and 3		\$1.00	
Plain No 4 5 and 6		1.25	
Toed. No. 1. 2. and 3		1.25	
Plain, No. 4, 5, and 6 Toed, No. 1, 2, and 3 Toed, No. 4, 5, and 6		1.50	
Resetting old shoes, each			
15 cents		. 60	
Shoes and nails furnished			
plain		. 75	
Shoes and nails furnished			
toed		1.00	

The Apprentice Question.—Having read several articles on this subject in which the writers are at a loss to understand why more young men do not learn the trade, I wish to say that for my part I can see no reason why a young man would want to learn the blacksmith trade, and my reasons are just this: According to most of our able writers, a young man should work for three or more years. Then he will be advanced along the line so he may start a shop of his own. He must compete with several brother blacksmiths in the town and the country, some of whom have never learned the trade. These "cheap Johns" and the fellows who just picked up the trade and went to work are, according to their own ideas, just as good workmen as any who spent seven years learning. Young men see all this. They are not blind. When they walk by, they see you under a horse, trying to put on a shoe and getting dragged all over the shop, jerked around all for from ten cents to a half dollar, or hammering out plow lays, blowing and hammering and sweating, all for from ten to twenty-five cents. Then they see you when you go home at supper time, all grease and dirt, your clothes all full of holes and yourself just about "all in." Does it look very inviting to become a smith? When you get home it takes several applications of soap and water to get a part of the dirt off, and your wife is compelled to put papers around your plate to keep the dirt and grease off the tablecloth.

Did you ever go into a strange town and look up the fine residences? Does the black-

smith live there? The man who just went by in the big, red automobile—is that the village smith? Does the village smith go on a vacation? That brick building on the corner doesn't belong to him either; but you'll find the smith hard at work in his shop. Yes, he is making money all right. He came here ten years ago with only \$40 and now he has got that big shop and all these tools almost paid for and has only worked about three hundred and sixty-five days in the year to do it, so you see he has made money all right.

I can hire a blacksmith for \$14 per week, but if I want to hire a man to dig a ditch it costs me \$3 to \$4 per day. Of course, he has to furnish a tiling spade and a longhandle shovel. Quite an investment in tools. Now, my way of thinking is that there is just one way to have more young men to learn the trade, and that is money. Raise the standard of blacksmithing by raising the price. Show the young man that there is something more than hard, dirty work, so he will be able to enjoy some of the luxuries of life; be able to take a vacation occasionally and be able to retire before he gets to be sixty or seventy years of age. How many retired blacksmiths are there in your town? When the young man sees better conditions he will take notice. You will have plenty of applications then for apprentices.

I see a brother asks how to raise prices. I will give him my receipt which works fine, as I have tried it. Suppose a man comes in to get a plow sharpened; when you hand it to him and he asks the price, don't say twenty-five cents, but say thirty-five or forty cents, and, if a lister, tell him sixty and seventy cents, and all jobs the same way, but be sure you do the job so it will suit him. Don't let him kick on the job and the kick on the price will soon be forgotten. The worst thing that can happen to a blacksmith is to have a farmer come back the next day with the plow or lister and say, "This will not run in deep enough. Can't make it work and here I have lost another day, running to the shop, when I should be at work." He would rather have paid two prices and have it work in the first place, as his time is worth money in the field. If you get what you deserve you will be surprised at night, when you count the extra dimes. For instance, suppose you sharpen thirty-five listers today; you raise your price ten or fifteen cents each; you will have enough to pay your hired man and a little to put in the bank the next day. You can hardly realize the difference until tried.

Now, the next important part of your business is, don't let the customer call for his work but once. Have it done when he wants it. Don't tell him you can't get to it today, for he will say, "Well, I will have to take it to the other shop, or take it back home to my neighbor, who has a shop, for I can't lose another day to come back after it." Get in the habit of turning off the work at once. Let your customers know that when they bring in the work to you that they can get it when they want it. What is twenty-five or fifty cents to a farmer when he wants to go to plowing in the morning. An extra trip to town costs him more than a dozen prices for plow or lister sharpening. G. B. JEWETT, Nebraska.

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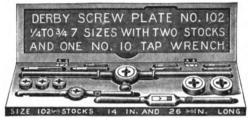
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Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, Aug. 25, 1909, and are subject to fluctuations. Corrected for The American Blacksmith by The National Heavy Hardware Reporter,

smith by The National Heavy Hardware Reporter, Chicago.

Correspondents report no changes whatever in quotations. Prices on both iron and steel are very firm and some jobbers are getting even higher prices than those quoted. The wire interests have made another advance and some correspondents are of the opinion that steel bars will soon advance. Farmers are busy in their fields and smiths generally have little work to do. Indications point to a very satisfactory fall trade, however.

There seems to be a scarcity of good hardwood lumber in first hands all over the country. The stocks owned by jobbers are only moderate.

Wholesale carriage manufacturers have decided to advance vehicle prices 10 per cent on account of increased cost of labor and materials.

to advance vehicle pri increased cost of labor	and mate	rials.	account or
Horse Shoes— All Iron Shoes Steel Shoes			\$4.40 4.25
Steel Shoes No. 0 and No. 1 25c additional charge	d for pac	be, per ke king more	e g
than one size in Mule Shoes	9. KAO		
Tip Shoes	Shoes		6.00 5.75
Tip Shoes			6.00 6.50
Side Weight			7.00 9.25
Toe Weight Side Weight E. E. Light Steel Steel Driving O. O. Mule Shoes, e	xtra		5.50 5.50 1.50
Merchant Bar Iron— \$1.70 rates full e 100 pounds extra	xtras an	d 20	ents per
Steel Bars— \$1.70 rates, full ex	tras.		
Toe Calks— Blunt Sharp	· · · · · · · · · · · · · · · · · · ·		Per box \$1.25 1.50
Carriage Bolts— 6 x § and smaller Larger and longer.			60– 10°°
Machine Bolts-	• • • • • • • •	· · · · · · · · ·	5 0%
4 x 1 and smaller Larger and longer	• · · · · · • • • • • • • • • • • • • •		60 -10°°° 50 °°°°
Nuts— Less than 10 lbs. of From 10 to 50 lbs.	a size		\$2.50 off 3.00 off
Washers— Same price as nuts.	Skein Ca	st	65 %
Malicables— Common\$.	Haif	Patent A	des — 65%
Single Spring, each Springs, black and h	alf bright		\$1.2 5
Hickory Lumber—Per 1 to 2½. 2½ to 4¼.	Foot—		\$.09½
Hickory Lumber—Per 1 to 2½. 2½ to 4¼.	Foot—		\$.09½
Hickory Lumber—Per 1 to 2½. 2½ to 4½. Ash and Oak Lumber—1-11 \$	Foot— -Per Foot71 21-3 -8 31-4		\$.09½ 11
Hickory Lumber—Per 1 to 2½. 2½ to 4½. Ash and Oak Lumber—1-11 \$	Foot— -Per Foot71 21-3 -8 31-4		\$.09½ 11
Hickory Lumber—Per 1 to 2½. 2½ to 4¼.	Per Foot- 07½ 2½-3 08 3½-4 	Feet— 13 to 17 \$65.00 68.00 75.00	\$.09½ 11
Hickory Lumber—Per 1 to 2½. 2½ to 4½. Ash and Oak Lumber—1-1½ \$ (1½-2 £ .	Per Foot	Feet— 13 to 17 \$65.00 68.00 75.00 80.00	\$.09½ 11 \$.08½ .09½ 18 to 24 \$75.00 80.00 85.00 104.00
Hickory Lumber—Per 1 to 2½. 2½ to 4½. Ash and Oak Lumber—1-1½ \$ (1½-2 £ .	Per Foot	Feet— 13 to 17 \$65.00 68.00 75.00 80.00	\$.09½ 11 \$.08½ .09½ 18 to 24 \$75.00 80.00 85.00 104.00
Hickory Lumber—Per 1 to 2½. 2½ to 4½. Ash and Oak Lumber—1-1½ \$ (1½-2 £ .	Per Foot	Feet— 13 to 17 \$65.00 68.00 75.00 80.00	\$.09½ 11 \$.08½ .09½ 18 to 24 \$75.00 80.00 85.00 104.00
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Hickory Lumber—Per 1 to 2½. 2½ to 4½. Ash and Oak Lumber—1—1½	Per Foot- 71 2 2 3 3 3 2 4 —Per M. 1 6 to 12 \$65.00 65.00 72.00	Feet— 13 to 17 \$65.00 68.00 75.00 80.00	\$.09½ 11 \$.08½ .09½ 18 to 24 \$75.00 80.00 85.00 104.00 Each. \$.60 1.20 2.20 2.20 2.30 3.00
Hickory Lumber—Per 1 to 2½. 2½ to 4½. Ash and Oak Lumber—1—1½ \$	Foot— -Per Foot -7½ 2½-3 -8 3½-4 -6 to 12	Feet— 13 to 17 \$65.00 68.00 75.00 80.00	\$.09½ \$.08½ .99½ 18 to 24 \$75.00 80.00 85.00 104.00 Each \$.60 1.20 2.20 1.30 2.00 3.00 3.00 3.00
Hickory Lumber—Per 1 to 2½. 2½ to 4½. Ash and Oak Lumber—1—1½ \$.6. 1½-2 £ Yellow Poplar Lumber ½ *** Rough Hickory Axles—3 x 4 6 ft 3½ x 4½ 6 ft 3½ x 4½ 6 ft 5 x 6 6 ft 4 x 5 6 ft 4 x 5 6 ft 4 x 5 6 ft 5 x 6 6 dy and 7 f 5 x 6 dy and 9 x 8 eight For 24 and 24 x 8 eight For 24 x 8 ei	Per Foot-	Feet— 13 to 17 \$65.00 68.00 75.00 80.00	\$.09½11 \$.08½9½ 18 to 24 \$75.00 80.00 85.00 104.00 Fach. \$.60 1.20 2.20 2.1.30 2.30 3.50
Hickory Lumber—Per 1 to 2½. 2½ to 4½. Ash and Oak Lumber—1—1½	Per Foot- 71 21-3 98 31-4	Feet— 13 to 17 \$65.00 68.00 75.00 80.00	*****
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Hickory Lumber—Per 1 to 2½. 2½ to 4½. Ash and Oak Lumber—1—1½	Per Foot- 7½ 2½-3 18 3½-4 -Per M. 1 6 to 12 265.00 65.00 68.00 72.00 - t	Feet— 13 to 17 \$65.00 68.00 75.00 80.00	******
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D. No. 13 and under	35-5 %
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$7 \times 9 \times 10 \dots 1.60 11 \times 1.6$	14 \$3.45 14 4.50 15 4.75 16 5.35 16 6.00 17 6.55 18 7.50
7 x 9 x 10 1.00 11 x 8 x 9 x 10 1.65 11 x 9 x 10 x 12 2.05 12 x 9 x 11 x 12 2.10 12 x 10 x 12 x 13 3.20 13 x 11 x 13 x 14 4.45 12 x 14 x 15 5.35	16 6.00
9 x 11 x 12 2.10 12 x 10 x 12 x 13 3.20 13 x	17 6.55 18 7.50
$12 \times 14 \times 15 \dots 4.45$	
Rough Sawed Felloes- 1½ x 2 " \$1.55 2	x 2½" 2.00
$1 \times 2 \times \dots 1.85$	x 3 " 5.75_
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Dlow Reams-	-
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Mixed Forest Second Grow	
21"\$1.60 \$2.90 21"1.70 2.95 21"1.80 3.05	\$3.50 3.60
3 X 30" 2 45 3 55	3.80 4.20
0 = = 0 =	4.85
Single Trees—Round— Fore 21 \$2.	est Second Growth 10 \$3.60
21" 22" 22" 22" 22" 22" 22" 22" 22" 22"	10 3.65 15 3.75
21"	85 4.25 45 4.80
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2 x 4 x 48" 21 x 48" 21 x 41 x 50" 21 x 41 x 50" 21 x 41 x 52" 21 x 5 x 52"	
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Oval Plow Singletrees—	Forest
21 x 30" and under	
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Mixed Forest Second Grow	White th Second Growth
21" and smaller \$2.65 \$3.65	\$4.65
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Forest Second Grow	th Second Growth \$5.00
2\"\$2.95 \$3.65 2\"3.55 4.15 3\"3.55 4.30	5.50 5.75
Express Singletrees, Turned-	
Mixed Forest Second Grow 24″ \$2.50 \$2.65	White th Second Growth \$3.75
21'' 2.50 2.65 $21''$ 2.90 3.65 $21''$ 3.50 4.00	4.00 4.75
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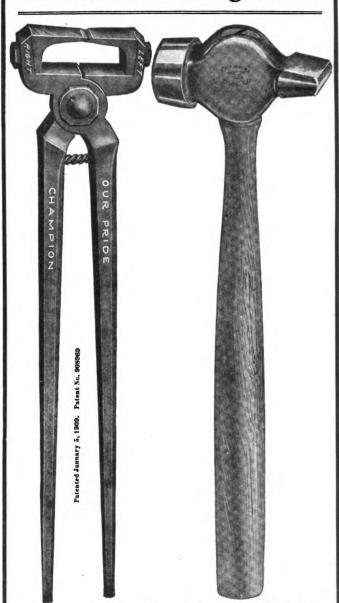
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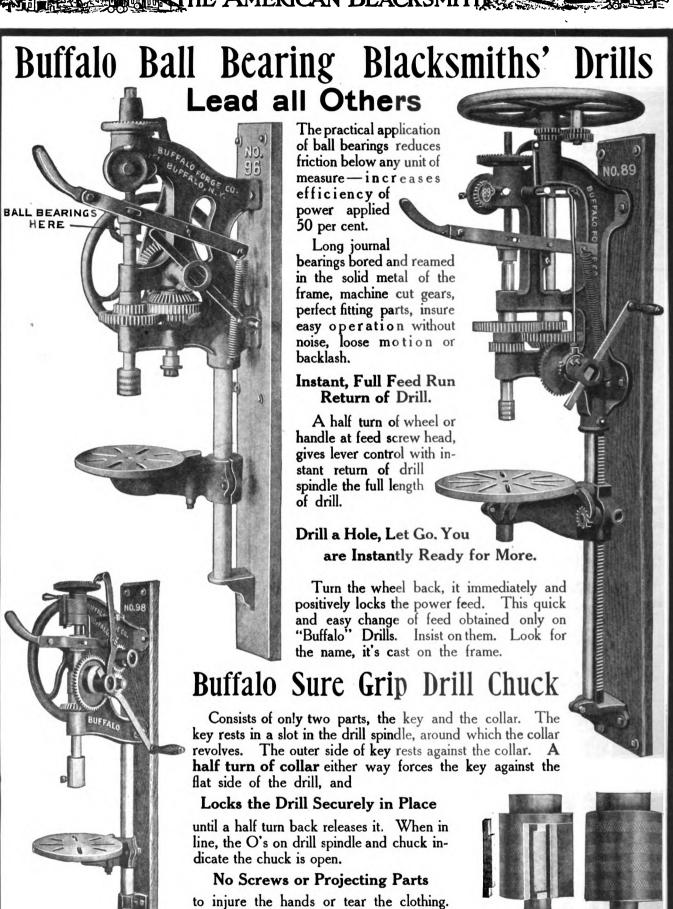
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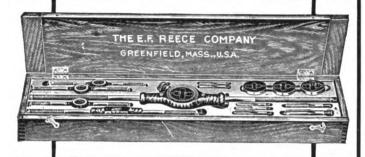
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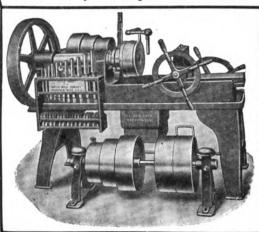
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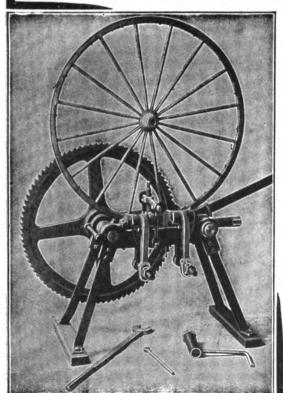
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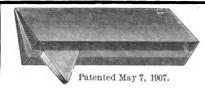
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Dry Batteries.
Nungesser Electric Battery Co.

Emery Grinders.

Kerrihard Company.
Crescent Machine Co.
Redlinger & Angle Mfg. Co.
Robertson Mfg. Co.

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Emery Wheels.
Chicago Wheel & Mfg. Co.
Sterling Emery Wheel Mfg. Co.
Horseshoe Nails.
Capewell Horse Nail Co.
Union Horse Nail Co.

Files & Rasps. Heller Bros. Co. Nicholson File Co.

Flexible Shafts. Chicago Flexible Shaft Co.

Forges.

Buffalo Forge Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Silver Mfg. Co.

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Air Cooled Motor Co.
Ajax Iron Works.
Davenport Ice Clipping Machine Co.
Detroit Engine Works
Fairbanks-Morse & Co.
Foos Gas Engine Co.
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Gardner Motor Co.
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Bryden Horseshoe Co.
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Humane Horseshoe Co.
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Rhode Island Perkins Horseshoe Co.
U. S. Horseshoe Co.

Horseshoe Pads. Goodyear Tire & Rubber Co. Morgan & Wright. Revere Rubber Co. Scientific Hoof Pad Co.

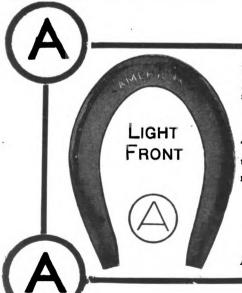
Horse Stocks. Geo. Barcus & Co. Hemphill Horse Stocks Co.

Horse Training. Prof. Jesse Beery.

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The most complete line for you to select from. Material and workmanship guaranteed to be the best. Our shoes always give satisfaction.

The best Horse Shoes in the land bear this trademark, the stamp of quality



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Plumbing Supplies. Chicago Housewrecking Co.

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Warner Pole & Top Co.

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Pulley Breaking Bridles. Prof. Jesse Beery.

Punches.

Bertsch & Co. Bicknell Mfg. & Supply Co. Buffalo Forge Co. Little Giant Punch & Shear Co.

Rubber Horse Shoes. Humane Horseshoe Co.

Rules

SEPTEMBER, 1909

L. S. Starrett & Co. Safety Thill Hitch. W. H. Watts.

Saws, Band.

aws, sand. Crescent Machine Co. Sidney Tool Co. Silver Mfg. Co. Defiance Machine Works

Schools.

International Correspondence School.
Rose Polytechnic Institute
Highland Park College o: Engi-

Screw Plates. Hew Plates.
A. J. Smart Mfg. Co.
Butterfield & Co.
Hart Mfg. Co.
E. F. Reece Co.
Wells Bros. Co.
Wiley & Russell Mfg. Co.

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Parry Mig. Co. Pioneer Pole and Shaft Co. Warner Pole & Top Co.

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C. C. Bradley & Son.
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Bertsch & Co.
Bicknell Mfg. & Supply Co.
Buffalo Forge Co.
Little Giant Punch & Shear Co.

Spoke Puller. Spoke Puller Mfg. Co. George Raithel & Son.

Springs.
E. B. Adams & Son.
Harvey Spring Co.
Raymond Mfg. Co.
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Geo. M. Ness, Jr.

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Bourne Fuller Co. Firth Sterling Steel Co.

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Stock Food. Eclipse Stock Food Co.

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Stocks & Dies.

Butterfield & Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Hart Mfg. Co.
E. F. Reece Co.
A. J. Smart Mfg. Co.
Wells Bros. Co.
Wiley & Russell.

Tires, Rubber.

Goodyear Tire & Rubber Co.
Morgan & Wright.

Tenoning & Boring Machines.
Silver Mfg. Co.
Sidney Tool Co.
Vulcan Iron Works.
Bicknell Mfg. & Supply Co.

Tire Bending Machines. National Tubular Axle Co.

Tire Heaters.
Rochester Tire Heater Co.

Tire Setters.

re Setters.
Brooks Tire Machine Co.
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Mayers Tire Setter Co.
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West Tire Setter Co.
National Hydraulic Tire Setter
Co.
G. M. Yost Mfg. Co.

Tire Shrinkers. Buffalo Forge Co.

Top Slats. F. F. Brown Mfg. House.

Tops & Trimmings.

Buob & Scheu.
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Indiana Top & Vehicle Co
Parry Mfg. Co.
Warner Pole and Top Co

Transfer Signs.
Palm Fechteler Co.

Twist Drills.
Cleveland Twist Drill Co.
Detroit Twist Drill Co.
Morse Twist Drill & Machine Co.

Typewriters.
Oliver Typewriter Co.

Vehicles.

Buob & Scheu.
Parry Mfg. Co.

Veterinary Remedies. Eureka Mower Co. Newton Horse Remedy Co. O. K. Stock Food Co. W. F. Young.

Vises.

Eagle Anvil Works. Hamilton Mfg. Co. Chas. Parker Co. Prentiss Vise Co.

Wagon Standards.
A. H. Harshbarger.

Welding Compound.
Cortland Welding Compound

Co.
Phillips-Laffitte Co.
Weldarine Mfg. Co. Welding Plates.

Phillips-Laffitte Co.

Wheels.

Boob Wheel Co.
Parry Mfg. Co.
Cray Bros. Wheels, Metal.

Electric Wheel Co. Empire Mfg. Co.

Wiring Machine, Rubber Tire. Spencer Mfg Co.

Wood Working Machinery.
Bicknell Mfg. & Supply Co.
Buffalo Forge Co.
Crescent Machine Co.
Defiance Machine Works
Sidney Tool Co.
Silver Mfg. Co.

Trade Literature and Notes.

THE LITTLE GIANT PUNCH AND SHEAR COMPANY, of Sparta, Illinois, whose announcement you will find on another page, has just issued a new catalog showing several very new and very useful machines. We show you here an illustration of their quick-action portable punch which the Little Giant people claim will punch thicker iron, requires less power, less space and is much lighter than any other portable



lever punch made. The handles are removable so the punch can be put into a satchel or toolchest, and the punch and dies are also made interchangeable. We must compliment this progressive concern on the very comprehensive way in which their new machines are described in this catalog, and any of our readers interested in the Little Giant line should certainly write for this beautiful booklet mentioning THE AMERICAN BLACKEMITE. CAN BLACKSMITH.

for this beautiful booklet mentioning The American Blacksmith.

A NEW SAW TABLE has just been put upon the market by The Silver Manufacturing Company, 365 Broadway, Salem, Ohio. The Silver people say that their Saw Table is adapted for fine and accurate service, and at the same time is very rigid, and the construction is such that it will transmit ample power for the rougher and heavier work found in all wood-working shops. The Silver announcement will be found on another page and a special circufar descriptive of these machines will be sent to anyone on request.

UNDOUBTEDLY THE TRADE will be interested in the new twelve-inch hand-feed planing and boring machine which The Defiance Machine Works, of Defiance, Ohio, are putting upon the market. A circular descriptive of this machine will be sent to any who mention their advertisement in TRE AMERICAN BLACKSMITH. The Defiance people claim many points of superiority for this machine and they especially call attention to the fact that it has complete equipment for making hubs, spokes, wagons, carriages, rims, shafts, holes, etc.

THE NEW-WAY MOTOR COMPANY, of Lansing, Michigan, have just issued a new catalog showing their very complete line of air-cooled engines. Among the engines in which our subscribers should be especially interested is the new six-horsepower vertical engine just put out by these people. The catalog fully describess thei line and is extremely well gotten up. A copy will be sent to any one who mentions The American Blacksmith.

UPON ANOTHER PAGE you will find the announcement of Cray Brothers descriptive of

CAN BLACKSMITH.

UPON ANOTHER PAGE you will find the announcement of Cray Brothers descriptive of the splendid new catalog which they are issuing. Cray Brothers carry goods which all of our subscribers use and these people will be glad to send a copy of this excellent publication to any of our friends.

THE CAMPBELL IRON COMPANY, of 'St. Louis, announces their removal to 809 Cass Ave., and state that they carry a full line of iron, blackamith, wagon makers and horseshoers supplies and tools.

ESTABLISHED WORKS **ANVIL**

200 DIFFERENT WEIGHTS AND SHAPES FROM 10 LBS. TO 800 LBS.



NONE BETTER MADE **OVER 300,000 IN USE**

THE ANVIL OF MANY MEDALS.

The "EAGLE ANVIL" has taken FIRST PRIZE wherever exhibited. When a man who KNOWS is ordering he always "Nothing but an Eagle for Because he knows that the body of the Eagle Anvil is made of unyielding crystalized iron, with hardened steel face, and not of fibrous wrought iron, that is sure to settle in face after a few

VISES OF MERIT

The "FISHER" Parallel Leg Vise is the only Leg Vise made having jaws that always remain parallel at whatever opening.

It is made heavy enough to withstand all strains and will last a lifetime. We also make a light, parallel

BENCH VISE of superior quality, fitted with plain or swivel base

Write for our descriptive Anvil and Vise Catalog.

Our goods are handled by reliable dealers everywhere.



1843

PARALLEL STRONG AND

FISHER & NORRIS,

33-47 Fair St.,

TRENTON, N. J.



When You Buy Horse Shoes

Is it not preferable to make your selection from the most complete line and the best shoes on the market?

United States Horse Shoes

"In a Class by Themselves"

Our Illustrated Catalogue shows all sizes and patterns. The book is free. We will gladly send a copy to your address. Write today.

We are giving away a handsome souvenir stick pin to every smith who sends his name and address. Did you get one? Don't wait until they are gone. Write today.

United States Horse Shoe Company
Rolling Mills and Factory, ERIE, PA.







BICKNELL'S One Piece All Steel Jointer Heads made with extensions for saws, cutter heads and boring attachment.

Bicknell Mfg. & Supply Co., Janesville, Wis.

Just What You Are Looking For.

The "Worfolk System" shows you how to convert an ordinary buggy or spring wagon into a speedy motor buggy. **Sent postpaid**, \$1.00.

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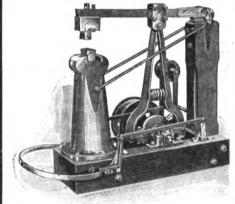
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Use your own body and wheels. We furnish the rest. Write for particulars.

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1620-1625 Ashland Block

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The Cheapest Helve Power Hammer Ever Made

and by far the best for the price. It is SO CHEAP that every blacksmith can afford to buy one. It will handle double the range of work that the ordinary upright hammer will handle, and is introduced to the trade as the

HAWKEYE POWER HAMMER No. 1

which adds another successful hammer to our list, making three sizes which we build.

THE PRICE WILL CERTAINLY SURPRISE YOU.

You can buy of your jobber or direct from us. Don't fail to write

HAWKEYE MFG. CO.,

CEDAR RAPIDS,

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NATIONAL TIRE BENDING MACHINE

for rolling steel and iron tire for wheels to a circle of any desired diameter. It will bend tire from the lightest to 10° wide by 1° thick. Is heavy and well proportioned. Furnished with tight and loose pulleys, with friction clutch pulley, or direct connected motor, if desired at an additional charge. We also manufacture solid steel loose collar axles and the National self-oiling tubular axles and steel stock and hog troughs.

WRITE FOR CIRCULARS AND PRICES.

NATIONAL TUBULAR AXLE COMPANY,

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BOLT CLIPPERS

CHAMBERS BROS. CO.

N. Fifty-Second St., PHILADELPHIA, PA.



HIGH SPEED DRII

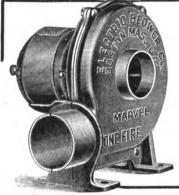
An ECONOMY, not a LUXURY, if you're equipped with the right drills.

The Twist Drill Co.

NEW YORK

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"MARVEL" ELECTRIC BLOWERS

"ONE FIRE" Marvel. \$28.00

For 4 Light Fires, 55.00

60.00 For 4 Medium Heavy Fires,

For 4 Heavy Fires, -80.00

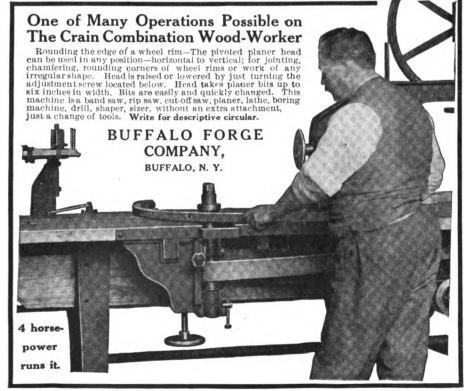
For 8 Heavy Fires, -120.00

Ask your Dealer, the Electric Light Co., or write to

ELECTRIC BLOWER CO.,

352 Atlantic Avenue,

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BUY A GARDNER

and you will have the simplest, most reliable and cheapest to operate, engine on the market today. Built in all sizes, Write at once for catalogue and prices.

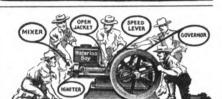
GARDNER MOTOR COMPANY 5143 Delmar Ave., St. Louis, Mo.



EVERYTHING NEEDED FOR IGNITION

The Dayton Electrical Mfg. Co.

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THE WATERLOO BOY

has all of the good points that go into

any gasoline engine besides many exclusive patented features. A few days' trial will enable you to point out the superior points that make the

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WATERLOO BOY

the best engine for every conceivable purpose
We will send to any responsible person a
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does not do all and more than we claim, if
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operate, send it back and we will pay the
freight both ways. Can you think of a more
liberal proposition than this? Write today
for our free catalogue, showing styles and
sizes and our free trial offer blank.

WATERLOO GASOLINE ENGINE CO.

YEARLY T. 198 W. 3rd Ave., Waterloo, Iowa.

Humane Cushion Heel Horse Shoes



ARE THE BEST

Because they are the only cushion shoes that can be used on the country roads as well as paved streets without destroying the rubber cushion.

Ask your jobbers for them.

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FOR STRENGTH, SAFETY, AND QUALITY OF MATERIAL

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HORSE NAILS
ARE THE BEST ALL AROUND
Perfection in form and finish. Made of the best Swedish from
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All Styles and Sizes THE AKRON-SELLE CO. AKRON, O.

LAFFITTE WELDING PLATES

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THE PHILLIPS-LAFFITTE CO. PHILADELPHIA, PA.



Over 2,000 Now Sold

The Best Power Hammer on the market. Works material up to 5 in. round.

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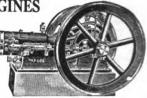
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United States. New Zealand Agents, All Jobbers. Alex. Storrie, Ltd., Invercargill. Manitoba, Saskatchewan and Alberta, Melotte Cream Separator Co., Winnipeg.

JUNIOR GASOLINE ENGINES

are built in the Largest Exclusive Cas Engine Plant in America. Catalog 49 tells of superior points in gas and gasoline engines which have been evolved as a direct result of twentytwo years'experience in manufactur-ing the Foos Gas Engines. Send for it.

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Withbard Bark Callero et Sandrand four-year courses, also one year courses in Steam and Electrical Engineering. Three months' courses in Traction and Gas Engineering. One-year Machinist's Course. Shop work from the beginning.

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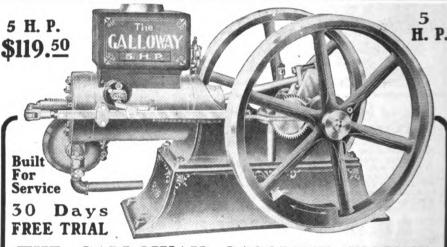
Agents Wanted Write for Prices The Air-Cooled Motor Co.

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For Plow Work, Wagon Work, Heavy Work, Any Work.

"Will strike as you like." Heavy or light at full speed or less, A broken anvil will cripple no other part of the hammer.

G. E. DAVIS, Mgr. DUBUQUE, IOWA.



THE GALLOWAY GASOLINE ENGINE

Owned and Made Exclusively by the William Galloway Co., Waterloo, Iowa

Owned and Made Exclusively by the William Galloway Co., Waterloo, Iowa will run your shop at several times its present capacity and enable you to take lots of jobs that you have to turn down now because you have not the capacity.

Only four things to do: Turn on the switch, turn on the oil, turn on the gasoline, give the fly wheel a start, and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs.

The Galloway has been classed as a standard, high-grade engine for 15 years. Over 2,500 in use in Iowa alone. Thousands in every other State and Territory.

If you try the Galloway engine, you will find that it is not overspeeded. Remember the bore and stroke counts and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake tests,

On the larger sizes, if it is not entirely convenient for you to pay all cash, I will take your note for the balance at the regular rate of interest for 6 months.

The price given is for the 5-horse power only, but we make these engines in seven sizes.

Note my special proposition to blacksmiths.

I have a plan by which every blacksmith can partly or entirely pay for his own machine. It's good; it's away out of the ordinary; and you will be overlooking a big chance if you don't write for my proposition.

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Ask for my free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure.

WRITE TODAY.

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THE WILLIAM GALLOWAY COMPANY, 577 Jefferson St., Waterloo, Iowa.

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The Milton Mfg. Company,

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STEEL WHEELS



To Fit Any Wagon Plain or Grooved Tire

Farmer's Handy Wagons All Standard Types

Special Inducements to Blacksmiths

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Steam Cooled Double Piston No Foundation

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Increase the **Efficiency**



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It will harden all your carbon steel tools and increase their efficiency from 50 to 150 per cent. "Kalux" means a Saving of Money to those who use it. It costs but a postage stamp to investigate. Tell us the nature of your steel hardening work and who your supply dealer is. Write Now.

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15,000 Sets WELDARINE

Sold in 1908 spells SATISFACTION

Prices reduced for 1909

Large Sets, \$3.00

Small Sets, \$2.00 Jumbo Sets, \$10.00

DON'T FORGET

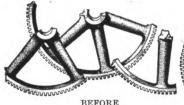
First—Weldarine is the only successful compound for brazing cast iron on the market.

Second —We can show you a greater net profit by using Weldarine than on anything else you have in your blacksmith or machine shop. Third-Weldarine is sold under a positive guarantee.

Fourth-We can prove every statement we make. Will you let us? Weldarine is handled by 150 of the best Heavy Hardware Jobbers in the United States. Write your Jobber, or

THE WELDARINE MFG. CO.

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BEFORE

One large set will do from \$75 to \$90 worth of work; small set from \$80 to \$40 worth.





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for repairing plows, cultivators and other instruments, be sure to ask for "STAR" goods and get the — All qualities and sizes, and everything guaranteed.

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Clip Horses For Profit

This splendid machine only \$7.50. It is the Stewart No. 1. Send \$2 and we will ship it C.O.D. for the balance. If you are not pleased, return at our expense and get your money.

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BUGGY TOPS, \$4.60 TOP BUGGIES, \$35.00 RUNABOUTS, \$32.00 Cushion Backs, Storm Fronts, Poles & Shafts. Write for 100-page Catalog. BUOB & SCHEU,

HELLER'S CELEBRATED AMERICAN HORSE RASPS, FILES AND FARRIER'S TOOLS

known and tested Standard of Excellence. All made from



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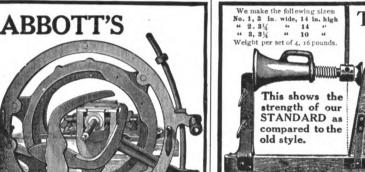
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The Bruce Malleable Wagon Standard

Tested thoroughly and guaranteed strictly as represented.
Note its great advantages over the old style.

1. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strength ening end of bolster, which in old style is weakened by mortise.

ened by mortise.

3. The Malleable Iron Standard has a 3½ in. face at base, which prevents wear on wagon box, while the old style has only

Which prevents works and a second of the saver. Can be attached to bolster in one as Y-in. face.

4. Great time saver. Can be attached to bolster in one fourth the time required to put on wood stake. Adapted to new and repair work.

If you have never tried the Bruce Standard, write today and ask for prices.

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brand and if your jobber cannot supply you write us direct. We manufacture a full line of High Grade Agricultural Steel Shapes, Fitted and Bolted Plow and Lister Shares, Merchant Plow Shares, Cultivator Blades, Subsoiler Blades, Landsides, etc., etc.

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CRESCENT FORGE & SHOVEL CO., Havana, III., U. S. A.

- USE HORSE SENSE -

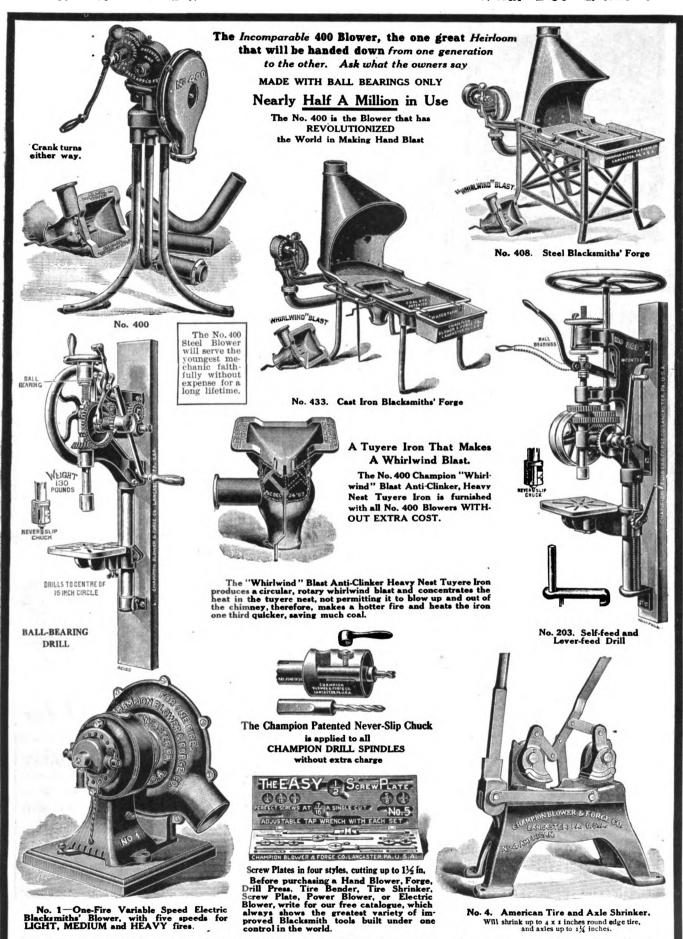


Ask Your Jobber About It!

RAYMOND MANUFACTURING CO., Ltd. CORRY, PENNSYLVANIA

THE REYSTONE TRACE OR DRAFT SPRING RELIEVES THE HORSE INTERVENTED OF ARS CAUSED BY THE UNEVENNESS OF THE ROAD AND WHEN TAXED CLOSES THE ROAD AND WHEN TAXED CLOSES THE ROAD CADACTEV START OF THE ROAD CADACTEV THE ROAD AND WHEN TAXED CLOSES,
THE ROAD AND WHEN SMAPLY CONVECTORS,
FULLEST CAPACITY
THUS FURNISHING A SOLID FULLEST CAPACITY SIMPLY CONNECTING
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LINK AND AVOIDING BEEAU ACT LOOK INTO IT!



THE CHAMPION BLOWER & FORGE CO., Lancaster, Pa., U. S. A.



4.000 Pounds





when he finds it to do. The result of neglected opportunity.

Many a man is turned away from the door in disappointment today simply because he hasn't the ability to hold a good position. The position is there but the man that secures it must be a trained man. Employers cannot afford to pay for the services of incompetents.

Seventeen years' of experience in the sole business of providing salary-raising training—bringing to thousands that knowledge which has secured for them better work, better earnings, and success—has proved that I. C. S. Training is the most powerful force in the world today for the promotion of ambitious men and women. You do not have to leave home, give up your present work, buy books, or inconvenience yourself financially. The I. C. S. adapts its salary-raising plan to the individual needs and circumstances of each one of its students. Start now for promand independence. Mark and mail the coupon.

International Correspondence Schools Box 1302, Scranton, Pa.

Please explain, without further obligation on my part, how I can qualify for a larger salary and advancement to the position before which I have marked X.

Foreman Molder
Foreman Blacksmith
Foreman Machinist
Foreman Toolmaker
Foreman Toolmaker
Foreman Patternmaker
Mechanical Engineer
Machine Designer
Mechanical Draftsman
Stationary Engineer
Electrical Engineer
Electrical Engineer
Electric-Railway Supt.

Electrician Architect Structural Engineer Contractor & Builder Foreman Plumber Civil Engineer Surveyor Mining Engineer Bookkeeper U. S. Civil Service Exam Ad Writer

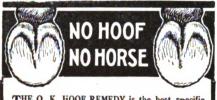
Name St. and No.__ City_ State



MAGNETOS REMY

Will start and run your Gas or Gasoline Engine without the aid of batteries. Inexpensive and absolutely reliable for either make and break or jump spark ignition. Information sent on request.

REMY ELECTRIC CO., Anderson, Ind.



THE O. K. HOOF REMEDY is the best specific on the market for Contracted Feet, Corns, Cracked or Brittle Hoofs, Scratches, Wire Cuts, &c. Blacksmiths can make money selling it to their customers. WRITE TODAY for Agents' Prices and Terms. Large sample, express prepaid, 25 cts.

THE O. K. STOCK FOOD COMPANY, 324 Dearborn Street. CHICAGO, ILLS.



ABSORBINE

Cures Strained Puffy Ankles, Lymphangitis, Poll Evil, Fistula, Sores, Wire Cuts, Bruises, Swellings, Lameness, and Allays Pain Quickly without Blistering, removing the hair or laying the horse up. Pleasant to use. \$2.00 per bottle at

dealers or delivered. Horse Book o D free.

ABSORBINE, JR., (mankind, \$1 bottle). For Strains, Gout, Varicose Veins, Varicocele, Hydrocele, Prostatitis, kills pain.

W. F. YOUNG, P. D. F., 230 Temple St. Mass.

Some of the Calks made by our Machine



Medium, City or Chicago Sharp



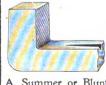
Medium, Ordinary or Country Sharp



Large, City or Chicago Block



A Blunt Philadelphia Kink



Summer or Blunt Calk, any desired Length

The American Calking Machine

forms any calk on a horse shoe that a horse-shoer can make with a hammer. Just heat the shoe and one pull of the lever forms the calk.



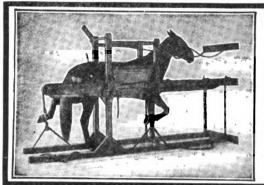
American Calking Machine Co. First National Bank Bldg., Chicago.



MONTROSS METAL SHINGLES



SHINGLE CO. CAMDEN, N



Hemphill's New Shoeing Stocks

Shoes the most vicious

No payment required until you test stocks.

No payment required until you test stocks.

The sills rest on the floor; there is no strain on building. Easily placed in any sized shop. When not in use stocks fold against wall and occupy small space. Horse cannot lie down, rear or pull back. Feet are held firm and taut by flexible foot clamps. We do not use a rigid vise-like foot hold. Impossible to break or injure horse's leg.

These stocks have been used and tested for years, Price, circulars and testimonials free on application.

THE HEMPHILL HORSE STOCKS CO.

THE HEMPHILL HORSE STOCKS CO. Rensselaer, Indiana, U. S. A.



The Sterling Emery Wheel Mfg. Co. TIFFIN, OHIO, U. S. A.



THE CRENSHAW SPOKE PULLER

IS THE MARVEL OF THE AGE

A thoroughly practical labor-saving device; will extract the spokes from any hub in a few minutes' time by simply opening out the levers and placing the spoke puller plates against the hub and then drawing levers together. This machine does with ease what has heretofore been tiresome, tedious and time-consuming work.

Order from your dealer, or write direct for full information.

THE SPOKE PULLER MFG. CO. 516 Empire Building, ATLANTA, GA.



RUBBER AIR CUSHION HORSESHOE PADS



See That Cushion? It fills with air at each step. That's what breaks concussion. That's what pre-vents slipping. That's what keeps the foot healthy. That's what cures lameness.



NO LAMENESS NO SLIPPING CHEAPEST AND BEST



REVERE RUBBER CO.

BOSTON, MASS

AVOID DANGER

SHOEING VICIOUS HORSES

BY USING

HORSE **STOCKS**

Perfectly safe, durable and easy to operate, they pay for themselves very Make your work easier, bring you more of it, and increase your profits. No progressive horseshoer can afford to be without this wonderful, labor-saving apparatus. Barcus stocks were the first and are still the best.

Write now for Catalog and Prices.

GEO. BARCUS & CO.

Box 61.

WABASH, IND.





TRANSFERS FOR ALL PURPOSES

Scrolls, Figures, Flowers, Letters, Animals, Stripings, Numerals, Corners, Etc., Etc.

Special Name Plates of all descriptions. Buggy Ornaments in sets. No Shop Complete without our Catalog.

New Catalog will be ready this spring, sent on receipt of \$1.00, which will be rebated on first order for more than this amount, or sent gratis with first order for \$1.00 or more. Plaid designs for automobile panels. Cane work effects. Basket work effects.

For the auto painter who has exhausted his ideas on distinctive color combinations.

> Inexpensive New Stylish WRITE FOR SAMPLES

Palm, Fechteler & Co.

67 Fifth Ave., NEW YORK

CHICAGO ST. LOUIS MONTREAL **TORONTO**

I. H. C. ENGINES AS Blacksmith's Powers

You are working at a disadvantage if your shop is not equipped with a good reliable power.

You have all kinds of work to do. Power on a good many of the jobs is an absolute necessity.

Consider the matter carefully and you will discover the best of reasons why you should have an I. H. C. gasoline engine in your shop.

With one of these engines installed you will have the satisfaction of knowing you will have power whenever you need it. You will find it better than a line shaft because you do not have to pay for power you do not use. You start your I. H. C. engine going whenever you need power, There is no waiting. Power is delivered instantly. All the power you need will be generated and delivered at the lowest possible cost. And when your work is done you shut off the engine and stop all expense instantly.

An I. H. C. engine will not fail you. They are simple and easy to understand and they are built on right mechanical lines. You have your choice of many sizes and styles of I. H. C. Gasoline Engines:

> Verticals—2, 3 and 25-horse power Horizontals (portable and stationary)—in 4, 6, 8, 10, 12, 15 and 20-horse power Air Cooled Engines—in 1 and 2-horse power

It will pay you to investigate these engines. It will interest you to look into their superior materials and the superior way in which they are constructed. International local agents have these engines on sale. Ask them for catalogs of the style you are interested in, or write direct to us.

INTERNATIONAL HARVESTER COMPANY OF AMERICA (INCORPORATED)

13 Harvester Building

CHICAGO, ILL., U. S. A.

AID FOR THE BLACKSMITH

Kerrihard Power Hammer

POWER HAMMER

Hammer and

Grinder Dept.

In the 1909 Model—Kerrihard Power Hammer—is offered by far the best, the most complete power hammer ever offered to the blacksmith trade. This is the concrete result of years of experience in manufacturing power hammers that have met the unanimous endorsement of blacksmiths everywhere. Here is a power hammer correct in every part, right in its proportions—taking up the minimum floor space consistent with efficiency—right in the metal from which it is east. No scrap—no junk heaps are drawn upon—when the Kerrihard is in the building—not a needless—burdensome fixture attachment. Each part working with every other—removing much of the heavy hand labor of the smithy, and transferring it to the hammer. That shop dependent upon hand-labor at the present day—when the Blacksmith's Best Friend—the Kerrihard Power Hammer is offered—is doomed to trail behind—instead of forging ahead. For—this hammer—is not only the best on the market—but 'its also sold at a price which removes all objections from the standpoint of expense. And—the terms—are a sure evidence that the Kerrihard Hammer—must perform—according to promise—else your trial costs nothing.

Ten Days' Approval Test

Ten Days' Approval Test

Each Kerrihard Power Hammer—is sold under a Ten Days' Approval Test. No cost to you—if this hammer iails to do as we claim—or is in any manner unsatisfactory. We leave it to you—to determine its utility—its money-saving value.

Price \$60-you save \$25 to \$50. This close price is the result of modern system in factory production. Not to be matched in quality—nor to be approached in Price, is the mofto that's responsible for the enormous sale of Kerrihard Hammers. You save \$25 to \$50—under our plan—and secure the greatest value for your money.

Consider—all these—the Matchless Utility Value, the Embodiment of the Latest Improvements,—the

the Embodiment of the Latest Improvements,—the Approval Test—the Low Price—then write Kerrihard for Specific Information and Descriptive

Literature.
A single day's delay means a loss to you—Today's action means—a step forward toward easing your physical labors and increasing your Bank account.

Will You-Do This-Just Now-Do Write



COMBINATION SAW and GRINDER

Red Oak, Iowa. THE KERRIHARD COMPANY. U. S. A.



The Soul of the Rowe Calk

The Mark of Calk Quality and Honesty



We Will Help Every Shoer to Sell Rowe Calks Get In Line For Big Profits This Winter.

Read every word of our offer. For the first time in calk history the shoer is to get the special advantage of a merchant and dealer.

Horseshoers in the past have been inclined to discourage to a certain extent the use of screw calks because such calks have been more or less defective. have been right in insisting that their customers, the horseowners, should be protected from defective, flimsy and unsatisfactory calks such as filled the market before the coming of the Rowe tool-steel center calks.

But the sales of Rowe calks have grown and grown until there is hardly a shop in the snow belt that does not now carry a more or less complete line of Rowe calks in sharps, blunts and pad calks of all sizes.

This growth has followed the steady This growth has tollowed the steady advance in the quality and usefulness of Rowe calks. Today these calks with their magnificient tool-steel centers, their soft outer surfaces, their uniform taper threads, their toughness at the base of thread shanks, and their perfect hardening are everywhere hailed as the first satisfactory and reliable screw calks.

New Era For Horseshoers.

The time has come when the distributors of one calk, the Rowe calk, and the horseshoers can unite in honestly recom-mending to horseowners a calk that will give satisfaction in every respect.

And this one distributor can engage in a general national advertising campaign because the Rowe calk is already in the hands of shoers everywhere, because the Rowe calk always gives satisfaction and makes permanent customers, and because the shoers can be relied upon to push and recommend the first satisfactory screw calk—the Rowe tool-steel center calk.

The general advertising of such a calk means that the better class of horseowners—those who pay cash or settle their bills promptly—will buy the Rowe calk in greatly increased quantities. And the quality of the Rowe calk means that such increased sales will be regular and permanent.

This condition will result in large and constantly growing profit to the shoers who handle Rowe calks. They will attract the cream of the trade to their shops for screw calks and much of this trade will remain to buy other things and to swell the regular shoeing business.

For the shoer who handles the best lines of goods has the earmarks of quality and a reputation for quality is the most of any kind can possess.

General Advertising to Horse-

Owners.

Throughout the calk season Rowe toolsteel center calks will be advertised in the leading journals and periodicals reaching farmers, physicians, livery stables, truckmen, teamsters, concerns employing large number of horses and horseowners generally.

This advertising will make the name of the Rowe tool-steel center calk a household word in the homes of horseowners through-

out the American snow belt.

It will help to keep the business of those who now use Rowe calks and it will certainly create thousands of new customers. Every horseshoer who handles Rowe calks will feel the pull of this advertising and will reap the profits bound to flow from it.

Booklet to Shoers' Customers.

A very attractive little booklet describino Rowe calks, how they are made, the materials used, why they are perfect, and the satisfaction they give is now being prepared. It is illustrated and it has the merit of being short enough to

This booklet is mighty interesting read-ing even for shoers and a postal will bring one to any address.

But the main purpose of the booklet is to educate the shoers' customers and the horseowners who may receive it and to induce them to use Rowe calks.

All shoers handling Rowe calks or who intend to use them are expected to send in the names of horseowners in their territory to whom they wish such booklets sent.

The last of November there will be mailed to each person upon every such list a booklet bearing the name and address of the shoer sending the list and the shoer will be designated as a local agent for Rowe calks.

The worth of this to every shoer taking advantage of the opportunity will be very great. New customers will be made and horseowners will come to the shoer to inquire about Rowe calks. It will not be up to the shoer to rely alone upon his time and efforts to talk up a new and unknown calk.

valuable thing that a shoer or merchant Free Plates for Home Advertising.

Horseshoers have not generally been in the habit of advertising in their local

papers.

Where this has been done it has usually been in the form of a card or brief announcement of the business of the shoer.

There is a big field awaiting the progressive shoer who will advertise. It will be all the more profitable because it is new. Those who are first will deserve and get the reputation of leading shoers.

We have prepared a series of very attractive and catchy ads. that will advertise Rowe calks and the shoer whose name is attached.

Plates are being made of these ads, and we will furnish them free to every shoer who handles Rowe calks and will publish them in his local paper.

Give the plates to the newspaper publisher and he will do the rest, and you will get the advertising and the profits without any trouble or bother in preparing the advertising copy.

These plates will be furnished in sizes that will not make the advertising charges

If you want the reputation and the profits and the increased business that Rowe calk users will enjoy, order your season's supply from your jobber today to insure early delivery.

Fill out and mail coupon below today, and get in right for the greatest prosperity you have ever known.

Rowe Calk Selling Company, Hartford, Conn.: Send your new booklet and information about free advertising plates to
My jobber is
Jobbers name must appear in every instance. B-9-9

THE ROWE CALK SELLING COMPANY, Hartford, Conn.

Send your list of Horseowners for booklets today.

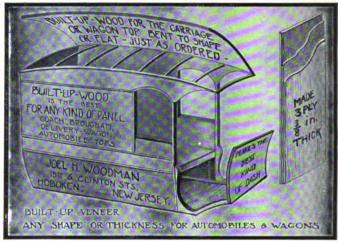
ADJUSTABLE DIES

In "Duplex" Die Stocks are instantly set by hand to exactly the size wanted, standard or over.



The dies also open when thread is cut and so avoid turning-back.

THE HART MANUFACTURING CO., 50 Wood Street, Cleveland, O, U.S.A.



Buffalo 200 Silent Blower exceeds every claim.

JOHN GLACKEN

Practical Horseshoer, Blacksmithing, Rubber Tire Work, Carriage and Wagon Building.

23 Bridge Street.

Amsterdam, N. Y., July 21, 1909.

BUFFALO FORGE Co., Buffalo, N. Y.

In reply to yours of the 9th inst, would say I am using your No. 200 Hand Blower and find it does all you claim for it and more. No man can make a mistake in buying your No. 200 Hand Blower. They work fine.

See pages 7, 15, 34, 39.

JOHN GLACKEN.



Say! Mr. Blacksmith.

have you heard about the new tire setter called

THE SCIENTIFIC HYDRAULIC?

Blacksmiths are just wild about it where it is used, and the manufacturers are either crazy or dead sure they have a "cinch" on the other fellows for they actually warrant it to be better than any other and will let you be the judge.

GET ONE QUICK IF YOU WANT TO KNOCK OUT YOUR COMPETITORS.

Write for information at once to

National Hydraulic Tire Setter Co.

KEOKUK, IOWA.



WHY should you have a ROCHESTER

WHY should you have a ROCHESTEK
WROUGHT IRON HEATER? Because it will save you more time and
money than any other labor saving device in your shop. It will remove
and put on tires of ordinary size, and
will not injure the
wheel. It
saves cutting and rewelding tire.
This heater
is perfectly
constructed
and is practically indestructible.
Write at Write at once for de-scription and our easy terms.

ROCHESTER TIRE HEATER CO., Rochester, N. Y.



Our Taps and Dies are the best that 34 years' experience and up-to-date methods can make them. The easiest cutting and longest wearing screw cutting tools made. Send for free catalog.

A. J. SMART MFG. CO., Greenfield, Mass.

HAY - BUDDEN

SOLID WROUGHT IRST MADE IN AMERICA

The Gold Medal Anvil HIGHEST AWARD

OMAHA, 1898 PAN-AMERICAN, 1901

Every genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with the best Crucible Cast Steel. Every genuine "Hay-Budden" Anvil is made by the latest improved methods.



ANVILS

Over 150,000 in Use WARRANTED

WEIGHTS FROM 10 to 800 LBS.

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO.,

BROOKLYN, N.Y.

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